SONY

Image Sensing Products catalogue

1999 - 2000 edition

Image is everything.

Sony Broadcast & Professional Europe
Imaging Sensing Products

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When it really counts, count on Sony.

Many things can depend on the Image Sensing Products you choose. Product performance, quality and reliability. Safety and security. Livelihoods and, sometimes, lives.

That's why Sony have designed, developed and manufactured a range of Image Sensing Products that you can depend upon. Totally. Even in the most demanding applications.
From factory automation, medicine and inspection to security and process control.

We thoroughly understand your requirements and the specialised environments in which our products are expected to operate. And the product range in this new catalogue - specifically compiled for the OEM and system integration markets - demonstrates that in-depth understanding, perfectly.

You'll see how we've utilised innovative technological solutions to meet your evolving needs through high quality, feature rich, benefit driven, easy to use and cost effective products.

Behind each is the unrivalled experience, resources and commitment to excellence of all of Sony's research and product groups. In addition, many solutions in the range bring you the clear operational advantages of Sony's frequent technology firsts.

For example, the world's first mass-market CCD video camera was launched by us in 1980. Followed, in 1983, by the lightest and smallest CCD camera module for industrial use.

As evidence of the way new ideas for the consumer market could benefit commercial applications and vice-versa, we adapted the manufacturing and miniaturisation techniques developed for our market leading camcorders to the EVI and FCB series industrial video cameras.

While from the broadcast line-up came the XCH series cameras, video industry products evolved into the XC and DXC series with special triggering functions.

Later we introduced Progressive Scan technology into the range to provide outstanding picture performance.
More recently, colour models in our digital camera selection incorporated the IEEE 1394 interface, a high speed, digital bus carrying video and control signals.

Since then, Sony has launched products that range from 3-D head mounted displays to high-resolution monochrome digital cameras with IEEE 1394 interfacing and full Donpisha shutters.

Today you'll discover an extensive collection of ISP solutions that range from cameras and accessories to a large selection of personal LCD displays. As you'd expect, the emphasis is on giving you value, choice and flexibility; whatever your application.
Cameras include those with and without housings. The DFW, XC, VID and EVI multimedia series are all cased. Cameras without housings are primarily aimed at those seeking unfinished products that can be simply integrated into their own systems. These can be found in the CCB series (card type) and the FCB and EVI series (block type).

To find the product that matches your needs more easily, there's an overview section (pages 42 and 43) while the camera range itself is further split into black and white models (pages 10 to 21) and colour models (pages 22 to 41).

Our line-up of head mounted displays for professionals, feature 2-D and 3-D versions which are, once again, split into products with and without housings.

If you would like further information on any product included here, please contact your local sales office, details of which can be found at the rear of this catalogue.

Alternatively, just visit our Website, for downloading literature and software, at www.sony.co.jp/ISP or www.pro.sony-europe.com/ISP/

SONY

Image Sensing Products Catalogue

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Lenses shown with illustrations of cameras are options unless otherwise specified.

IEEE 1394 Technology

First introduced by Apple with the name "FireWire", the IEEE 1394 digital connection standard has been applied with growing success in consumer video and in broadcast, under the generic name "i-Link". Suitable for high-speed, low-cost network transfer of any digital data, the IEEE 1394 is already successfully implemented in networking computers and peripherals, in mass storage, instrumentation networks, in printing and in professional audio.

Sony began integrating IEEE 1394 into its industrial colour camera range in 1996 to bring a new dimension to its imaging technology. Much more than just a new connection standard, IEEE 1394 is, for Sony, a major opportunity to re-invent the video camera for industry and multimedia. It overcomes most of the traditional limitations related to connection, format, modulation standards, speed, grabbing techniques, accuracy and processing. This year Sony introduces two high-resolution monochrome IEEE 1394 cameras that feature industrial high-speed asynchronous shuttering and scaleable output format.

The IEEE 1394 standard

IEEE* 1394 is a high-speed, non-proprietary, scaleable digital serial bus that transports data at current rates of 100, 200 and 400 Mb/s (bits per second), with 800 Mb/s achievable in the near future. Its definition, development, compliance and application promotion are supported by more than 180 companies, grouped in the 1394 Trade Association**.

How do you connect?

Up to 63 nodes may be connected peer-to-peer in acyclic topology (no loops), Hot plugging/unplugging is allowed, and the topology is dynamically managed and updated by the hardware in a transparent way for the user. Total addressing space is 64 bits.

Maximum cable length per hop is currently 4.5 m, mainly to ensure reliable maximal topology management and propagation delay control when a standard low-cost cable is used. Longer distances may be achieved with small topology and higher grade cable, or by using repeaters. Behaving as 3-ports active nodes, repeaters do not only restore signals for another 4.5m, they also allow a lateral branch interconnection to the topology.

How is the data transmitted?

Data and timing signals are transported on a low-cost cable made up of two shielded, twisted pairs. Every 125 µs cycle is divided by an arbitrating device (one of the nodes) in time slots called channels, each channel being allocated to a communication between any device of the network to any other at a selectable speed.

Real-time transmitting devices may reserve channels, up to a limit. This transmission mode, called "isochronous", features guaranteed bandwidth and delivery time. As each cycle may contain several isochronous channels, simultaneous transmission of real-time data, like image and voice or synchronous images, is supported. The remainder of the cycle is allocated to asynchronous transmission, typically of controls/reports and any time independent data. No other digital busses have the ability to bring real-time video and audio to the desktop while providing the user with flexible, cost effective and expandable connectivity.

What are the differences between i-Link and 1394-based digital cameras?

In consumer and broadcast equipment (i-Link), a TV-standard based video signal must be transmitted, with very high visual quality, and combined with audio, time-code and commands like play, stop and rewind. The captured picture features practical limitations in vertical and horizontal resolution, and a fixed 4:3 or 16:9 aspect ratio. Video, audio and control data are combined and reduced by a high quality compression. Protocol is AVC. Typical bandwidth is 33 Mb/s.

Most of the devices are self-powered, so that connection needs only 4 pins (the two IEEE 1394 twisted pairs).

For industrial video data, the camera is assumed to have any resolution or frame rate, to transmit pure data without any compression, and to be remotely controllable for DSP functions. Adopting IEEE 1394 for industrial cameras has provided a huge opportunity to overcome all previous limitations by using a specific protocol: 1394-based Digital Camera Specification, issued by the DC working group of the 1394 Trade Association.

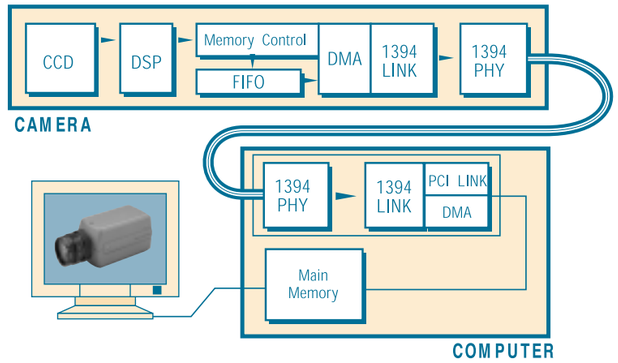
The 1394-based Digital Camera

With IEEE 1934, a camera becomes a Plug-and-Play computer peripheral, using a generic, low-cost and high performance connecting standard. While hot plugged, the camera describes its name, serial number, version and capabilities to the network.

The 200 or 400 Mb/s bus speed allows uncompressed live pictures to be transmitted in isochronous mode, while asynchronous commands can set up and reconfigure the camera operation at the same time, interactively with the application.

PAL or NTSC concepts are not applicable anymore. Pure CCD data is directly transmitted to computer RAM, with direct pixel to byte(s) equivalence.

IEEE 1394 technology video stream



Absence of any degradation due to conversion, modulation, transport or re-sampling gives an accuracy that has never been possible with analogue technologies. Geometrical, sub-pixel, luminance and colour measurements are improved.

A frame grabber board is not required, a generic 1394 host adaptor card connects the computer to the network. Camera data and processing may be network-shared.

The camera has only one 6-pin connection cable (four IEEE-1394 wires, plus ground and power); 6-4 conversion connectors exist. Most host adaptor cards have 6-pin connectors and provide the power to the 1394 link.

Any sensor size is applicable. Interlaced output mode may be suppressed, and new types or colour filter are possible (primary colour Bayer). Square pixels design can be applied without output format compromises.

For further details on the IEEE 1394 digital camera range please refer to pages 12, 24, 25, and 26.

How to develop your application?

Several solutions are possible. Please contact your local Sony sales office for recommendation on the latest available solutions:

1. Some major companies specialising in image processing and instrumentation have announced compatible hardware and software libraries for Sony 1394-based digital cameras.
2. Use a commercially available 1394 host adaptor card, and develop using available APIs.
3. Use a commercially available 1394 host adaptor card, and develop using a 1394 development toolkit and the 1394-based Digital Camera Specification, version 1.20.
4. Use a DFW kit, a ready-to-use cost-effective solution proposed by Sony.

The DFW Kit

DFW Kit	DFW Kit 2
A PCILynx™ compatible host adaptor card for PCI bus (200 Mb/s)	A PCILynx™ compatible host adaptor card for PCI bus (400 Mb/s)
TWAIN for Windows98 and ActiveX for Windows95	TWAIN for Windows98, WindowsNT4.0 and Windows2000
Documentation	Documentation
Supports VGA format cameras	Supports VGA, XGA and SXGA format cameras

Under control of a DFW kit equipped PC, a Sony 1394 digital camera can be used as the input device to various existing image processing software supporting the TWAIN standard. Camera images can be live-previewed on-screen and parameters adjusted for optimum quality before a still image is acquired and transferred to the application.

*IEEE (Institute of Electrical and Electronic Engineering) has standardised the IEEE 1394 serial bus.

**More information on IEEE 1394 can be obtained from the 1394 Trade Association at http://www.1394ta.org

Interlaced Scan Black and White Technology

Monochrome interlaced scan CCD cameras have been the first industrial video cameras launched by Sony for Image Sensing Products Department. In the late '80s, Sony introduced revolutionary solid-state sensors, called CCDs (Charge Coupled Devices). These devices were an outstanding improvement to the then current thermeonic pick-up tubes. They were smaller, needed less power, were highly resistant to shocks and vibration, immune to external magnetic fields, no image "sticking" with bright objects, no charges overflow from overexposed points to adjacent image zones - and they provided consistent performance. Back then, those characteristics were ideal for many demanding applications. However the most exciting feature of a CCD for industrial users was its ability to build up a picture where all the points were acquired at the same time in a fixed geometrical array. Only the read-out process was an interlaced scanning type to conform with the requirements of TV standards. In pick-up tubes, based on a scanning beam reading a photo-mosaic area, individual parts of the picture were not synchronous, and the geometrical accuracy of the read-out was highly unpredictable and dependent on frequent readjustment.

Due to its capability of capturing an instantaneous image with high accuracy, the CCD boosted the use of cameras in factory automation and picture processing applications. At that time, Sony developed CCD cameras integrating a special feature: the capability to synchronise the acquisition and read-out of external events. Different techniques such as restart-reset, shuttering, asynchronous shuttering and Donpisha modes were introduced step-by-step as the needs of industry evolved.

Ten years later, these cameras are still widely used by industrial customers and represent a major part of our success. Sony has therefore decided not only to keep these products in production, but also to progressively introduce a technological update of the full camera range that still matches our customersí requirements: small size, easy setting, mechanically robust, several sensor sizes (including 2/3-inch), easy connection and operation with a range of capture boards.

The first step of this technological update is the launch of the XC-ST Series. While maintaining best sellers such as the XC-75/75CE and XC-73/73CE in its product range, Sony has launched a new series, the XC-ST. As well as the XC-ST70CE models, successors of the well-known 2/3-inch XC-77CE cameras, additional models have been introduced, the XC-ST50CE (1/2-inch) and the XC-ST30CE (1/3-inch). All models share the same housing and features (please refer to page 15 for further details). A new cost-effective power supply, the DC-700/700CE, has been introduced for these models (please refer to page 19 for further details).

The second step in this product update programme is the introduction of the XC-ES and XC-EI Series cameras. These are made up of four new models, the XC-ES50CE, XC-ES30CE, XC-EI50CE and XC-EI30CE. They present major improvements in size and in spectral sensitivity (please refer to page 15 for further details). The DC-700/700CE power supply is recommended for these camera modules (please refer to page 19 for further details).

Technical update: external controlled shuttering modes

Name	Description	Comments	External signals needed	Applicable models
Restart-Reset by VD	Sensor keeps integrating light while readout and output are stopped/ restarted	First output depends on past illumination. 2 step process induces a delay. Useful for long-term integration	External HD Several external VD	XC-77 Series / XC-75 Series XC-73 Series / XC-55 Series New XC-ST Series New XC-ES Series New XC-EI Series
Restart-Reset by trigger	As above	As above. Internal generation of several VD by menu or switch selection	Trigger only	XC-7500 XC-8500CE
Donpisha	Sensor is kept empty with camera in wait mode. Integration starts immediately trigger is received. Picture is ready for output at end of integration	No capture delay		Generic description First implemented in XC-77RR/CE
S-Donpisha	Donpisha with integration time the difference between ext trigger and ext VD	Needs external hardware for accurate integration time control	External HD, external trigger, external VD. Special mode without ext VD, fixed shutter	XC-75 Series XC-73 Series
E-Donpisha	Donpisha. Integration time can be selected internally or by trigger pulse width	Extended features. Dual integration time selection. Synchro reset and non-reset modes	External HD, external trigger, external VD. Simplified trigger by use of CMA-87	XC-7500 XC-8500CE
E-Donpisha II	Donpisha. Integration time controlled by trigger pulse width	Simplified version. Reset mode only. Easy switch to non-triggered mode by trigger input	External HD, external trigger, external VD	XC-55 series
Easy trigger	Donpisha. Integration time controlled by rear panel switches or by trigger pulse width	Ease of use. Dual integration time selection. Synchro reset and non-reset modes. Picture out may be delayed. Easy switch to non-triggered mode by trigger input	External HD, external trigger, external VD. New reset mode with only one external signal: trigger	New XC-ST Series New XC-ES Series New XC-EI Series

Progressive Scan Technology

The evolution of Progressive Scan technology

Introduced in the early 1990's, Progressive Scan remains the main Sony technology in the evolution of industrial imaging for many high-speed applications. The term Progressive Scan relates to a specific design of CCD. In this design, images are acquired through a progressive integration mode that has been specifically developed to meet the need for a high quality imaging solution.

Conventional picture integration modes

The current generation of conventional CCD sensors are designed for use in the interlaced scanning systems of video and TV. These systems have two fields, each of 312.5(CCIR) or 262.5(EIA) scanning lines, interlaced to form a single 625 or 525-line, 1/25 or 1/30 second picture. To be displayed, each video picture is processed using one of two alternative signal charge integration modes:

- field integration mode uses the double integration of two adjacent lines, giving low vertical resolution but high dynamic resolution. This is the preferred method for most live video applications
- frame integration mode uses the integration of each odd line after integrating each even line, giving high vertical resolution but low dynamic resolution. This is the preferred method for shooting still objects, such as captions.

The Progressive Scan concept

In some industrial applications, problems occur when a camera shoots fast moving objects. This is due to the time delay between the acquisition of odd and even fields - the picture appears blurred if an object is moving quickly compared to the CCD refresh rate. One solution is to use only one field, which reduces the vertical resolution. Other solutions are to use a mechanical shutter or an external strobe light (extra cost and lower reliability). The best answer is the application of Progressive Scan technology, which uses a revolutionary progressive scan CCD sensor. This design of sensor is specifically designed to integrate all the lines at the same time - bringing sharp, clear and high resolution pictures in all circumstances.

How Progressive Scan functions

In the field integration mode, the charges from two adjacent pixels are mixed together and then transferred to the vertical register. In the frame integration mode, the charges from odd lines and even lines of pixels are alternatively transferred to the vertical registers.

In a Progressive Scan CCD, the charges from all the pixels are transferred to enhanced vertical registers. These charges are then transferred to one or two horizontal registers. Progressive Scan cameras featuring dual outputs can capture up to 60 full frames per second.

Applications benefiting from Sony Progressive Scan cameras

For industrial applications, Progressive Scan cameras combined with square pixel CCD sensors, represent the optimum solution for high-speed shooting application such as traffic control, quality control or factory automation, machine vision applications, etc. For applications involving image measurement or still imagery where the highest resolution is required, the Sony Progressive Scan CCD provides high resolution, blur-free images which represent the best possible solution for scientific imaging applications.

Progressive Scan Cameras

The Sony '99-'00 Progressive Scan product range includes four mono-CCD models, the XC-55 and XC-55BB (please refer to page 13), XC-7500 and XC-8500CE (please refer to page 14), and four digital models, the XCD-X700 and XCD-SX900 (please refer to page 12), DFW-V500 and DFW-VL500 (please refer to page 24), as well as one 3-CCD model, the DXC-9000/9100P (please refer to page 27).

The pictures below show a comparison between the three different readout methods: field integration, frame integration and Progressive Scan integration when shooting a train moving at 60 km/h.

Frame Integration mode

Field Integration mode

Progressive Scan

The Glasstron concept

The Glasstron concept

As a logical step in vision development, Sony recently entered the worlds of Virtual Reality (VR) and Head Mounted Displays (HMD). After 2-D, experiencing 3-D is a giant step forward and Sony has taken it with the launch of a complete product line-up that includes a 3-D HMD in finished and unfinished versions, a digital signal converter and a range of accessories. Sony has met the challenge of providing large-screen, high resolution viewing on a portable, lightweight and easy-to-wear display by combining Sony optical design with SVGA compatibility. For the professional market, customised products are available to match specific applications.

Innovation

The Glasstron concept provides mobility, wide-screen viewing, image confidentiality and an adjustable see-through mode, all with an outstanding high-resolution picture and Megabass sound. Even stereoscopic viewing of both video and computer signals is provided on high-resolution models!

More than a simple video device, the Glasstron Series are a radical change in working methods, especially when designing in 3-D. These products really open doors to many new 3-D applications for industrial users at a really cost-effective price. And all Glasstron models have no radiation emissions and no magnetic pollution for HMD users.

Technology

The Glasstron concept is available in various LDI versions: 2-D models exist in finished (see pages 52 and 53) and unfinished Series. 3-D models also exist in finished (see pages 54 and 55) and unfinished Series. The unfinished Series (see pages 56 and 57) is particularly well adapted for integration applications.

Constructed from a tough magnesium alloy body, the LDI models simulate the view of a high-quality monitor screen (30-inch or 52-inch) from a comfortable distance (1.2 m or 2 m). This "virtual" image is created by a pair of unique, Sony-developed, 0.7-inch LCD panel displays. These give an exceptionally detailed picture resolution that subjectively exceeds SVGA quality.

The advanced optical systems of the Glasstron series feature high-quality half-tinted mirrors that have ultra low distortion and maximize incoming light in both video and SVGA resolution (see chart). In addition, the high quality see-through mode brings quality transparency to all models.

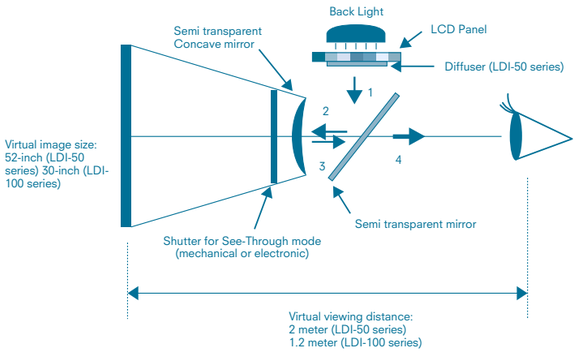
Easy to Wear

These Head Mounted Displays offer many advantages, for example providing total immersion in a highly detailed, personal audio-visual environment. Total immersion, high-resolution images and interactivity melt together in one of the most complete portable display solution ever manufactured. In addition, associated with the 120 g display unit, a new professional headband features multi-user settings and enables the integration of tracking devices, representing the perfect solution match for a fully wearable application.

The ergonomic design of the finished models allows them to be worn comfortably by spectacle wearers. The head displays fold away, making them easy to carry and store.

Advanced optical design for LDI-100 series and LDI-50 series

Concave mirror optical system



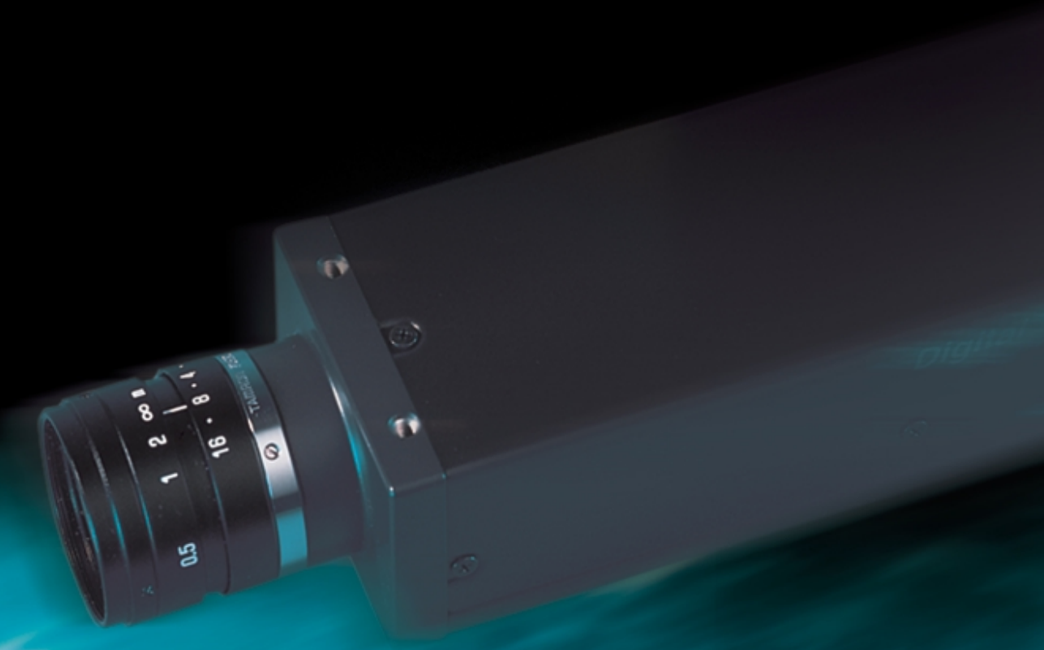
A World of Applications

Combining minimal weight with high-resolution images, the Glasstron Series opens up a wide range of opportunities for professional users in many market areas. From Virtual Reality to Augmented Reality, 3-D graphics, CAD/CAM design, medical training, architectural modelling, telerobotics, computing, mobile security, TV viewing, the list is endless. The displays are also a highly attractive option for creators of arcade games (driving, flight and sports simulators), museum displays and other entertainment and information tools. There can be no doubt that the Glasstron Series have the potential to radically improve VR systems, and be the turning point in making 3-D viewing universally available to professionals.

The Sony range of imaging products has many applications.

Here are just a few...

Factory automation and process control
Multimedia
Surveillance
Broadcasting
Medical
Videoconferencing
Telecommunications
Electronic photography
Videophones
Amusement
Image processing
Pipeline inspection
Desktop conferencing
Robotics
Traffic control



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Black & White Cameras

XCD-X700
new XCD-SX900

Outline

Cameras for industrial applications take a giant leap forward in performance, cost effectiveness and compact size with the introduction of the new Sony, IEEE 1394-based, XCD-X700 and XCD-SX900 models.

They offer all the advantages of the high resolution (respectively 0.8 and 1.3 million square pixels) IEEE 1394 interface and feature the easy-to-use asynchronous frame shutter function.

Designed to fit perfectly into ever-more demanding industrial environments, these new cameras are the latest examples in the logical move of the complete XC analogue camera line-up to the IEEE 1394 digital format.

New features such as scalable format (4 x 4 selectable zones in trigger mode) become available with the introduction of version 1.20 of the IEEE 1394-based digital camera specification.

The XCD-X700 and XCD-SX900 incorporate a newly developed industrial 6-pin IEEE-1394 connector that is used to power the camera, output the digital image and connect all the functions of the camera for computer control. This new industrial connector consists of an inner and outer shell that together provides higher electromagnetic immunity and better mechanical resistance to shock and vibration in severe industrial environments. The inner part is compatible with generic 6-pin IEEE-1394 connectors, so that standard cables can be used as well.

These characteristics make these new cameras ideally suited to highly demanding applications in image processing and machine vision.

- **Square pixels.**
- **Progressive Scan CCD.**
- **High resolution: XGA (XCD-X700) and SXGA (XCD-SX900).**
- **Continuous output mode**
  - 15 fps, 7.5 fps (XCD-X700).
  - 7.5 fps, 3.75 fps (XCD-SX900).
- **External trigger output mode**
  - full size or scalable scan with higher rate (Format_7).
  - fast image output.
- **Asynchronous shutter, External trigger.**
- **BNC external trigger connector.**
- **6-pin IEEE 1394 new industrial latching connector.**
- **Robust and compact size**
  - 44 (W) x 33 (H) x 116 (D) mm.
  - 300 g.

XCD-X700

XCD-SX900

XCD-SX900 Cables

Specifications	XCD-X700	XCD-SX900
Pick up device	1/2-inch IT Progressive Scan CCD	
Interface format	IEEE 1394-1995	
Data format	1024 x 768 Y (mono), 8 bits, 15 fps	1280 x 960 Y (mono), 8 bits, 7.5 fps
	Non compressed	Non compressed
	Scalable 4 x 4 zones in trigger mode	Scalable 4 x 4 zones in trigger mode
Lens mount	C mount	
Data rate	400 Mb/s , 200 Mb/s, 100 Mb/s	
Shutter speed	2.0 ~ 1/100,000 s	
Trigger	External (hardware)	
Power requirements	DC 8 ~ 30 V; less than 4 W. Supplied through IEEE 1394 cable	
Transmission protocol	IEEE-based digital camera specification (ver 1.20)	

XC-55
XC-55BB

Outline

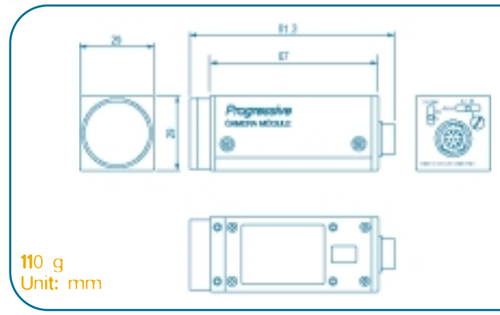
The Sony XC-55 and XC-55BB models offer all the advantages of Progressive Scan technology (please refer to page 7 for details) and feature the easy-to-use E-Donpisha II Asynchronous frame shutter function.

Although both types have very compact dimensions, the remote head of the XC-55BB, using Nf mount lenses from the XC-333 / 777 / 999 range, is particularly able to operate in small places and has an impressive resistance to shock and vibration.

- **Square pixels.**
- **Remote head version (XC-55BB).**
- **Alternative shutter modes**
  - normal shutter (up to 1/8,000 s).
  - E-Donpisha II asynchronous frame shutter (1/4 to 1/100,000 s).
- **Output selectable between EIA and non-interlace Progressive Scan.**
- **Restart / Reset mode.**

XC-55

XC-55BB



110 g
Unit: mm

Specifications	XC-55	XC-55BB
Pick up device	1/3-inch IT Progressive Scan CCD	
Signal system	EIA / Progressive Scan	
Picture elements	659 (H) x 485 (V)	
Lens mount	C mount	Nf mount
Horizontal resolution	500 TV lines	
Output modes	1I: 2:1 Interlaced (1/60 s x 2)	
	1N: Non-interlaced (1/30 s)	
External sync system	HD/VD (2~5 Vp-p)	
Normal shutter	1/100 ~ 1/8,000 s	
Trigger shutter E-Donpisha II	1/4 ~ 1/100,000 s	
S/N ratio	56 dB	
Min. illumination	0.5 lx (F1.4)	
Sensitivity	F5.6 (400 lx)	
Power requirements	DC 12 V; 1.8 W	DC 12 V; 2.2 W
Regulations	UL, FCC, CE, C-Tick	

XC-7500 (EIA)
XC-8500CE (CCIR)

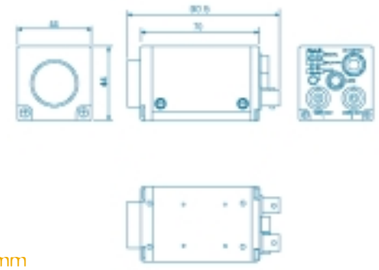
Outline

The XC-7500 and XC-8500CE are frame shutter cameras featuring the latest high resolution, Progressive Scan 1/2-inch format CCD.

With their compact and lightweight design, these two cameras are ideal for critical applications such as image processing and real-time high-speed machine control systems.

An E-Donpisha high-speed asynchronous shutter gives the capability of capturing random, fast moving objects. By using two outputs, up to 60 full frames per second are shot.

- **Square pixels.**
- **Frame shutter** (up to 1/100,000 s).
- **E-Donpisha asynchronous full-frame shutter.**
- **Restart / Reset mode.**



Specifications	XC-7500	XC-8500CE
Pick up device	1/2-inch IT Progressive Scan CCD	
Signal system	EIA / CCIR or VGA with CMA-87	CCIR / EIA or SVGA with CMA-87
Picture elements	659 (H) x 494 (V)	782 (H) x 582 (V)
Lens mount	C mount	
Horizontal resolution	500 TV lines	580 TV lines
Output modes	2 I: Interlaced (1/60 s)	2 I: Interlaced (1/50 s)
	2N: Non-interlaced (1/60 s)	2N: Non-interlaced (1/50 s)
	1N: Non-interlaced (1/30 s)	1N: Non-interlaced (1/25 s)
External sync system	HD/VD, VS	
Normal shutter	1/125 ~ 1/10,000 s	
Trigger shutter E-Donpisha	∞ ~ 1/100,000 s	
S/N ratio	60 dB	58 dB
Min. illumination	3 lx (F1.4 with IR cut filter)	
Sensitivity	F4 (400 lx)	
Power requirements	DC 12 V; 2.5 W	
Regulations	UL, FCC, CE	

CMA-87

Outline

The CMA-87 is a memory adaptor / scan converter designed for use with the XC-7500 and XC-8500CE Progressive Scan cameras. The unit combines the dual field outputs from the camera into a single interlaced output, which can be used by conventional image processing systems. The scan converter function of the CMA-87 also converts video from the cameras into CCIR or VGA (for XC-7500) or EIA or SVGA (for XC-8500CE). Moreover the CMA-87 allows high speed scanning of reduced height pictures.

- **Easy-to-use external trigger.**
- **Frame memory for E-Donpisha shutter.**
- **High scanning rate (up to four times standard rate).**
- **External synchronization.**
- **Write Enable pulse output.**
- **Output signal formats**
  - XC-7500: VGA, EIA, CCIR.
  - XC-8500CE: SVGA, CCIR, EIA.
- **Compatible with DC-77RR/CE camera adaptor** (please refer to page 19).
- **DC 12 V operation.**

XC-ST30 (EIA) / XC-ST30CE (CCIR)
XC-ST50 (EIA) / XC-ST50CE (CCIR)
new XC-ST70 (EIA) / XC-ST70CE (CCIR)

Outline

The new XC-ST Series of compact black and white camera modules incorporates the next generation of CCDs (please refer to page 6 for further details).

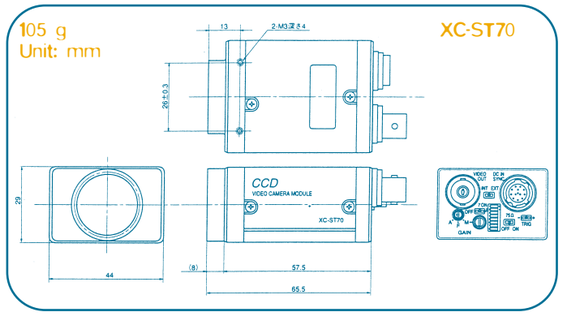
The XC-ST70CE features a 2/3-inch IT Hyper HAD CCD, the XC-ST50CE a 1/2-inch IT HAD CCD and the XC-ST30CE a 1/3-inch IT HAD CCD.

The XC-ST Series is easy to operate, with all switch settings on the rear panel. Their flexible controls and small size facilitate system integration. Excellent images of fast moving objects can be captured with the built-in electronic trigger shutter.

The recommended camera adaptor for the XC-ST Series is the compact and lightweight DC-700CE (for further details please refer to page 19).

Offering high picture quality and excellent sensitivity, the XC-ST Series is ideal for applications in industry, microscopy and machine vision.

- **High sensitivity**
- **High S/N ratio**
- **Electronic shutter function**
- **Flexible trigger shutter function**
- **Readout on command**
- **Restart/Reset function**
- **High shock and vibration resistance**



Specifications	XC-ST30	XC-ST50	XC-ST70	XC-ST30CE	XC-ST50CE	XC-ST70CE
Pick up device	1/3-inch IT CCD	1/2-inch IT CCD	2/3-inch IT CCD	1/3-inch IT CCD	1/2-inch IT CCD	2/3-inch IT CCD
Signal system	EIA			CCIR		
Picture elements	768 (H) x 494 (V)			752 (H) x 582 (V)		
Lens mount	C mount					
Horizontal resolution	570 TV lines			560 TV lines		
External sync system	HD/VD					
Electronic shutter speed	1/4 ~ 1/10,000 s			1/4 ~ 1/8,000 s		
S/N ratio	56 dB	60 dB		54 dB	58 dB	
Min. illumination	0.5 lx (F1.4, AGC ON, without IR cut filter)	0.3 lx (F1.4, AGC ON, without IR cut filter)		0.5 lx (F1.4, AGC ON, without IR cut filter)	0.3 lx (F1.4, AGC ON, without IR cut filter)	
Power requirements	DC 12 V; 1.6 W	DC 12 V; 2.1 W		DC 12 V; 1.6 W	DC 12 V; 2.1 W	
Regulations	UL, FCC, CE					

XC-ES50 (EIA) / XC-ES50CE (CCIR)
XC-ES30 (EIA) / XC-ES30CE (CCIR)
new XC-EI50 (EIA) / XC-EI50CE (CCIR)
XC-EI30 (EIA) / XC-EI30CE (CCIR)

Outline

The XC-ES Series and the XC-EI Series are new analogue ranges of ultra-compact, monochrome camera modules. The latest Sony surface mount technology results in an ultra compact, rugged unit that provides high quality images. A standard 12-pin connector provides control of input/output signals. All settings can be adjusted on the rear panel of the cameras.

Infrared sensitive versions with Exwave HAD technology (XC-EI Series) are included in the range for low light applications, or for use with IR lighting systems.

The recommended camera adaptor for these units is the compact and lightweight DC-700CE. For further details on this model, please refer to page 19.

- **Ultra small size:**
  - 29 (W) x 29 (H) x 32 (D) mm
  - 60 g.
- •• **High sensitivity.**
- ••• **Electronic shutter function.**
- •••• **Flexible trigger shutter function:**
  simple trigger with internally generated VD.
- ••••• **Readout on command.**
- •••••• **Restart / Reset function.**
- ••••••• **High shock and vibration tolerance.**

Specifications	XC-ES30	XC-EI30	XC-ES50	XC-EI50	XC-ES30CE	XC-EI30CE	XC-ES50CE	XC-EI50CE
Pick up device	1/3-inch IT CCD		1/2-inch IT CCD		1/3-inch IT CCD		1/2-inch IT CCD	
Signal system	EIA				CCIR			
Picture elements	768 (H) x 494 (V)				752 (H) x 582 (V)			
Lens mount	C mount							
Horizontal resolution	570 TV lines				560 TV lines			
External sync system	HD/VD							
Electronic shutter speed	1/4 ~ 1/10,000 s				1/4 ~ 1/8,000 s			
Video output	1.0 V p-p sync negative 75 Ω							
S/N ratio	60 dB (TYP. Min Gain)							
Min. illumination (with F1.4, Max Gain)	0.3 lx	0.2 lx	0.3 lx	0.1 lx	0.3 lx	0.2 lx	0.3 lx	0.1 lx
Power requirements	DC 12 V; 2.1 W							
Regulations	UL, FCC, CE							

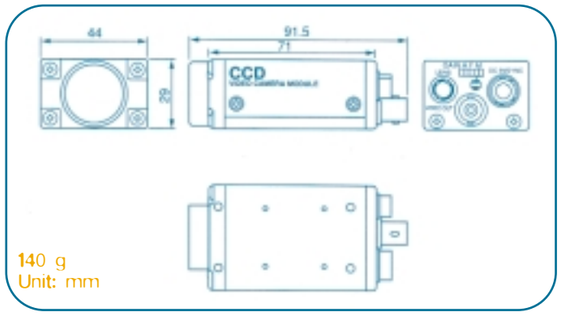
XC-75 (EIA) / XC-75CE (CCIR)
XC-73 (EIA) / XC-73CE (CCIR)

Outline

The XC-75CE (1/2-inch IT CCD) and XC-73CE (1/3-inch IT CCD) are monochrome video camera modules providing high picture quality for the factory automation and image processing markets.

All these models provide a choice of shutter modes (Normal, Variable and Asynchronous) making them ideally suited to process control applications.

- **High S/N ratio.**
- •• **Asynchronous shutter (S-Donpisha).**
- ••• **External shutter speed control.**
- •••• **Frame / field integration.**
- ••••• **Restart / Reset mode.**



140 g
Unit: mm

Specifications	XC-73 / XC-75	XC-73 / XC75CE
Pick up device	1/2-inch IT CCD (for XC-75 and XC-75CE)	
	1/3-inch IT CCD (for XC-73 and XC-73CE)	
Signal system	EIA	CCIR
Picture elements	768 (H) x 494 (V)	752 (H) x 582 (V)
Lens mount	C mount	
Horizontal resolution	570 TV lines	560 TV lines
Video output	1.0 Vp-p, sync negative, 75 Ω unbalanced	
External sync system	HD/VD, VS	
Normal shutter	1/125 ~ 1/10,000 s	
Trigger shutter S-Donpisha	1/100 ~ 1/1,600 s	1/80 ~ 1/1,500 s
S/N ratio	56 dB	54 dB
Min. illumination	3 lx (F1.4 with IR cut filter)	
Sensitivity	F4 (400 lx)	
Power requirements	DC 12 V; 1.6 W for XC-75/CE - 1.4 W for XC-73/CE	
Regulations	UL, FCC, CE	

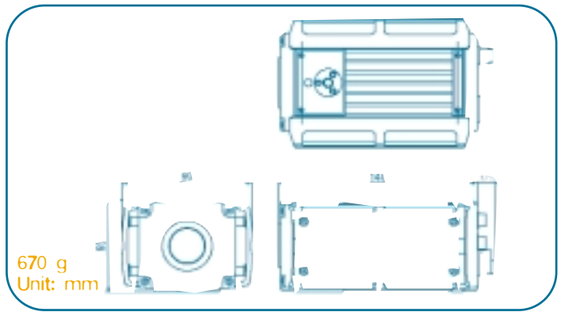
XCH-1125 (EIA)

Outline

The XCH-1125 is an 1125-line, high resolution monochrome camera module using a 1-inch, 2 million pixel FIT CCD. Functions include normal and Donpisha shutters, CCD iris and long duration exposure. The XCH-1125 is suitable for use in applications such as high-end pattern recognition and image processing.

Note: The XCH-1125 Camera is compatible with the range of "Genesis" frame grabber boards (Genesis and Genesis LC) manufactured by Matrox®. Please contact your local Sony sales office for details.

- **High resolution, 2 million pixels.**
- **External synchronization input.**
- **High S/N ratio.**
- **16:9.**
- **Ultra-low smear.**
- **2:1 interlaced / non-interlaced operation.**
- **Donpisha asynchronous shutter.**
- **Restart / Reset and long term integration.**



Specifications	XCH-1125
Pick up device	1-inch FIT CCD
Signal system	BTA standard S-001 / SMPTE 240M
Picture elements	1940 (H) x 1040 (V), 16:9
Lens mount	C mount
Horizontal resolution	1000 TV lines
External sync system	HD/VD, VS
Electronic shutter speed	1/60 ~ 1/100,000 s
S/N ratio	56 dB
Min. illumination	9 lx (F1.4)
Sensitivity	F1.4 (400 lx)
Power requirements	DC 12 V; 12 W from MSI-1125
Regulations	FCC, UL, CE

DC-77RR (AC 100 V and 110 V) / DC-77RRCE (AC 220 V)
DC-777 (AC 100 V and 110 V) / DC-777CE (AC 220 V)
new DC-700 (AC 100 V and 110 V) / DC-700CE (AC 220 V)

Outline

All units provide DC power to XC series cameras via a CCXC-12P cable. As well as power, this cable carries composite and Y/C video from the camera and, where used, an external synchronization signal in the reverse direction. Connectors for these services are provided on the rear of these adaptors.

The DC-77RRCE provides two buffered camera video outputs, and has a synchronization input with switchable 75Ω termination. The unit is delivered with a generic interface which can be removed to host the CMA-87 adaptor of the XC-7500/8500CE or the CMA-999P adaptor of the XC-999P.

The DC-700CE compact model features an external synchronization I/O and a trigger input/WEN output. With an XC-7500/8500CE camera connected, two video outputs are provided, however, when used with an XC-55BB, a trigger input takes the place of one of the video outputs. Other XC cameras use this second connector as a clock output.
Dimensions are 110 (W) x 53 (H) x 160 (D) mm.

DC-700CE

CCB-MS37CE (CCIR)
CCB-ME37 (EIA) / CCB-ME37CE (CCIR)
CCB-ME47 (CCIR) / CCB-ME47CE (CCIR)

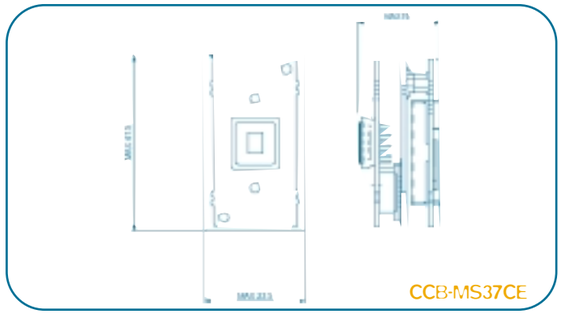
Outline

The CCB-MS and CCB-ME Series of cameras have been designed specifically for portable applications, however their miniature sizes and low power consumption make them suitable for a wide range of applications. A Power Saving mode ensures maximum battery life, with a convenient Quick Start mode for hand-held applications such as 2D barcode reading systems. With the exception of the CCB-MS37CE, all models have an HD/VD external synchronization capability and exist in EIA and CCIR versions.

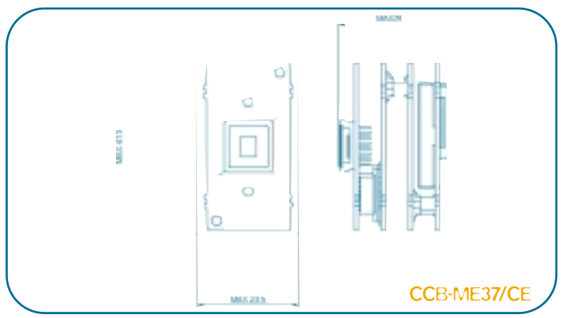
CCB-MS37CE

CCB-ME37/CE

- **Ultra compact size.**
- **Low power consumption.**
- **Quick Start mode.**
- **Power Saving mode** (less than 80 mA).
- **Field / Frame Integration mode.**
- **Gain 0 - 12 dB** (default 0 dB).
- **External gain and shutter control.**
- **External (HD/VD) synchronization system** (except CCB-MS37CE).



CCB-MS37CE



CCB-ME37/CE

Specifications	CCB-MS37	CCB-ME37	CCB-ME37CE	CCB-ME47	CCB-ME47CE
Pick up device	1/3-inch IT CCD			1/4-inch IT CCD	
Signal system	CCIR	EIA	CCIR	EIA	CCIR
Picture elements	752 (H) x 582 (V)	768 (H) x 494 (V)	752 (H) x 582 (V)	768 (H) x 494 (V)	752 (H) x 582 (V)
Horizontal resolution	560 TV lines	570 TV lines	560 TV lines	570 TV lines	560 TV lines
Electronic shutter speed	1/50 ~ 1.10,000 s	1/60 ~ 1.10,000 s	1/50 ~ 1.10,000 s	1/60 ~ 1.10,000 s	1/50 ~ 1.10,000 s
Gamma	1 / 0.45 (with modification)				
S/N ratio	50 dB				
Min. illumination	5 lx (F1.4)			10 lx (F1.4)	
Power requirements	DC 6V; 2 W			DC 5.5 - 9 V; 2 W	

CCB-M25 (EIA) / CCB-M25CE (CCIR)
CCB-M27B (EIA) / CCB-M27BCE (CCIR)
CCB-M35A (EIA) / CCB-M35ACE (CCIR)
CCB-M37 (EIA) / CCB-M37CE (CCIR)

Outline

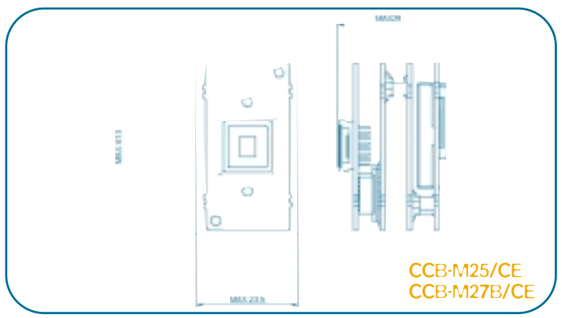
The CCB-M Series of cameras offers space-saving advantages in many imaging applications, these miniature sized models demonstrating the capability of Sony to use advanced, high density, surface mount technology. This range of four cameras utilizes sensitive Hyper HAD CCDs in 1/3-inch and 1/2-inch formats and at medium and high resolutions. All cameras have the same very compact dimensions and comprise separate CCD and processing boards. The use of optional extension cables allows the CCD board to be positioned at up to 150 mm away from the processing board. The CCD board has threaded holes to either accept the range of dedicated lenses that is available or for mounting other optical devices.

The basic camera boards require three regulated DC voltages. Alternatively an optional PSB-915IA Power Supply Board, which operates on a single regulated 5 V supply, can be attached to the rear of the processing board. A range of modifications can be made (detailed in the instruction manual) to provide the user with maximum flexibility. Custom power supply boards can be attached to provide CCD iris or external synchronization features to the cameras.

CCB-M25/CE

CCB-M27B/CE

- **Ideal for OEM and system integrators.**
- **Lightweight** (17 g, CCD and processing boards combined).
- **DC 5 V, 15 V and -9 V supplies required for operation** (DC 5 V only with optional PSB-915IA Power Supply Board).
- **Remote head available with extension cables.**
- **Internal sync as standard.**
- **Electronic shutter speed scalable up to 1/10,000 s.**



CCB-M25/CE
CCB-M27B/CE

Specifications	CCB-M25 (EIA)	CCB-M27B (EIA)	CCB-M35A (EIA)	CCB-M37 (EIA)
	CCB-M25CE (CCIR)	CCB-M27BCE (CCIR)	CCB-M35ACE (CCIR)	CCB-M37CE (CCIR)
Pick up device	1/2-inch IT CCD		1/3-inch IT CCD	
Picture elements	510 (H) x 492 (V) (EIA)	768 (H) x 494 (V) (EIA)	510 (H) x 492 (V) (EIA)	768 (H) x 494 (V) (EIA)
	500 (H) x 582 (V) (CCIR)	752 (H) x 582 (V) (CCIR)	500 (H) x 582 (V) (CCIR)	752 (H) x 582 (V) (CCIR)
Horizontal resolution	380 TV lines	570 TV lines	380 TV lines	570 TV lines
Electronic shutter speed	1/60 ~ 1/10,000 s (EIA)			
	1/50 ~ 1/10,000 s (CCIR)			
AGC	ON/OFF (with modification)	OFF/ON (with modification)	ON/OFF (with modification)	OFF/ON (with modification)
Gamma	0.45 / 1 (with modification)	1 / 0.45 (with modification)	0.45 / 1 (with modification)	1 / 0.45 (with modification)
Integration mode	Field / frame (with modification)			
Min. illumination	0.3 lx (F1.2)	0.25 lx (F1.2)	0.2 lx (F1.2)	0.3 lx (F1.2)
Power requirements	DC +5 V ± 0.1 V (less than 100 mA), DC +15 V ± 0.3 V (less than 15 mA)			
	DC -9 V ± 0.4 V (less than 10 mA)			

Digital Camera Modules	p.24, 25, 26
3-CCD Colour Video Cameras	p.27, 28, 29
CCD Colour Video Camera Modules	p.30, 31, 32
Single Chip CCD Colour Video Cameras	p.32
Colour Card Cameras	p.33
Colour Camera Modules	p.34, 35
Colour Camera Blocks	p.36, 37
Intelligent Communication Colour Video Cameras	p.38, 40
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Video Presentation Stands	p.41

Colour Cameras

DFW-V500
DFW-VL500

Outline

The DFW-V500 and DFW-VL500 use IEEE 1394 technology and incorporate the 400 Mb/s chipset. Both models integrate a Progressive Scan CCD that features square pixels (no geometric distortion). Progressive Scan technology brings sharp, high resolution pictures, even of fast moving objects (for further information on Progressive Scan technology, please refer to page 7).

The primary colour filter and YUV 4:2:2 data format offer high colour accuracy. Both models include an external trigger mode for asynchronous shutter operation.

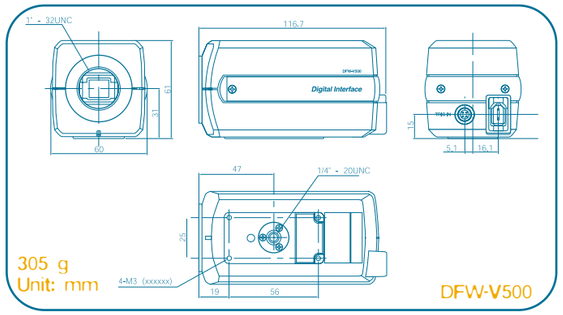
The DFW-V500 has a C-type lens mount while the DFW-VL500 includes a 12x zoom lens with motorised zoom, iris and focus.

A single 6-pin IEEE-1394 cable is used to power the camera, to output the digital image and to control all the functions of the camera from a computer. After capture, the image is transferred to a computer at a high transmission speed.
These characteristics are attractive for highly demanding colour applications, in image processing and in machine vision.

DFW-V500

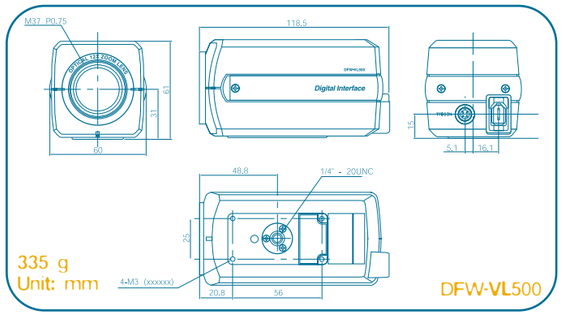
DFW-VL500

- **Square pixels.**
- **Progressive Scan CCD.**
- **Full motion picture (30 f/s) / strobe shutter / long term integration.**
- **400 or 200 Mb/s data rate.**
- **Primary colour filter.**
- **4-pin external trigger connector, latching.**
- **6-pin IEEE 1394 connector, latching.**
- **Aluminium diecast body.**



305 g
Unit: mm

DFW-V500



335 g
Unit: mm

DFW-VL500

Specifications	DFW-V500	DFW-VL500
Pick up device	1/3-inch IT Progressive Scan CCD Primary Colour	
Interface format	IEEE 1394-1995	
Data format	640 x 480 YUV (4:2:2), 8 bits, 30f/s, non-compressed	
	640 x 480 YUV (4:1:1), 8 bits, 30f/s, non-compressed	
	320 x 240 YUV (4:2:2), 8 bits, 30f/s, non-compressed	
	160 x 120 YUV (4:4:4), 8 bits, 30f/s, non-compressed	
Lens mount	C mount	12x built-in powered zoom
Data rate	400 Mb/s, 200 Mb/s	
White balance	ATW, One-push, 3200 K, 5600 K, manual	
Speed shutter	5.0 ~ 1/100,000 s	
Min. illumination	6 lx (F1.2)	14 lx (F1.8)
Trigger	External (hardware)	
Power requirements	DC 8 ~ 30 V; 4 W supplied through IEEE 1394 cable	
Regulations	IEEE 1394, UL, FCC, CE, VCCI. C-Tick	
Transmission protocol	IEEE-based digital camera specification (ver 1.04)	

DFW-V300

Outline

The DFW-V300 utilises the IEEE 1394 high performance serial bus to provide pure, non-compressed, YUV digital data for image capture, compression and transmission systems.

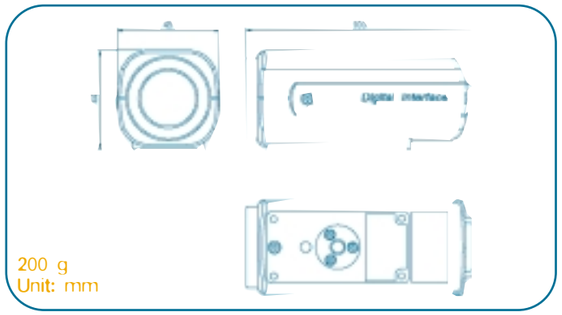
The camera can be controlled remotely via an IEEE 1394 compatible personal computer, allowing control of camera functions such as colour tone, brightness, picture quality, white balance and AGC (Automatic Gain Control).

The DFW-V300 has a data transmission rate of 200 Mb/s.

The 1/2-inch CCD offers a large field of view that is ideal for microscopy applications and its C mount is suitable for a wide selection of optics and couplers.

DFW-V300 Cable

- **IEEE 1394 Digital YUV output (8 bits).**
- **Non-compressed data.**
- **Full-motion picture (30 f/s).**
- **Full digital control.**
- **Auto Tracing White (ATW) balance.**
- **Single 6-pin connector transfers DC power, control and data - latching connector.**
- **C mount.**
- **Aluminium diecast body.**



200 g
Unit: mm

Specifications	DFW-V300
Pick up device	1/2-inch IT CCD
Interface format	IEEE 1394-1995
Data format	640 x 480 YUV (4:1:1), 8 bits, 30 f/s, non-compressed
	320 x 240 YUV (4:2:2), 8 bits, 30 f/s, non-compressed
	160 x 120 YUV (4:4:4), 8 bits, 30 f/s, non-compressed
Lens mount	C mount
Data rate	200 Mb/s
White balance	ATW, One-push, Manual
Shutter speed	1/30 ~ 1/12,000 s
Min. illumination	6 lx (F1.2)
Power requirements	DC 8 ~ 30 V; 3 W supplied through IEEE 1394 cable
Regulations	IEEE 1394, FCC, UL, CE, VCCI, N50
Transmission protocol	IEEE-based digital camera specification (ver. 1.04)

CCM-DS250

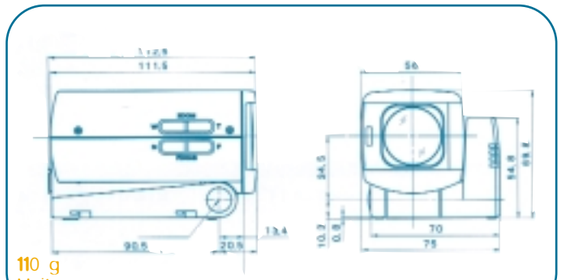
Outline

The CCM-DS250 is a fully digital camera, using the IEEE 1394 high performance serial bus to provide pure, non-compressed, YUV digital data for image capturing, compression and transmission systems.

The camera has desktop dimensions and is operated directly from a PC. Fixed onto the document arm, the CCM-DS250 captures documents from business card to letter size. As well as desktop applications, its power zoom lens makes it well suited for videoconferencing use. For this application, a privacy shutter guards against accidental calls.

This unit offers a cost-effective opportunity to gain the benefits of IEEE 1394 technology.

- **IEEE 1394 digital YUV output (8 bits).**
- **One simple 6-pin connector transfers DC power, control and data.**
- **Full-motion picture (30 f/s).**
- **Full digital control.**
- **Auto Tracing White (ATW) balance.**
- **12x optical powered zoom lens.**
- **Powered focus and iris.**
- **Pan and tilt adjustment (manual).**
- **Privacy shutter.**



110 g
Unit: mm

Specifications	CCM-DS250
Pick up device	1/3-inch IT CCD
Interface format	IEEE 1394-1995
Data format	640 x 480 YUV (4:1:1), 8 bits, 30 f/s, non-compressed
	320 x 240 YUV (4:2:2), 8 bits, 30 f/s, non-compressed
	160 x 120 YUV (4:4:4), 8 bits, 30 f/s, non-compressed
Lens mount	12x built-in powered zoom f=5.4 ~ 64.8 mm, F1.8 ~ F2.7 with motor and iris focus
Data rate	200 Mb/s
White balance	ATW, One push, Manual
Shutter speed	1/60 ~ 1/12,000 s
Min. illumination	30 lx (F1.8)
Power requirements	DC 8 ~ 30 V; 4 W supplied through IEEE 1394 cable
Regulations	IEEE 1394, FCC, UL, CE, VCCI, N50
Transmission protocol	IEEE-based digital camera specification (ver.1.04)

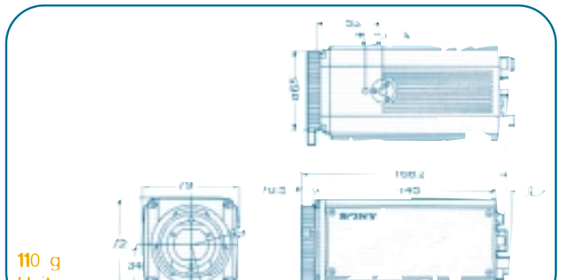
DXC-9000 (NTSC)
DXC-9100P (PAL)

Outline

The DXC-9000 and DXC-9100P are high performance, compact, 1/2-inch 3-CCD colour cameras. Using Progressive Scan technology (please refer to page 7 for further details), these cameras capture objects moving at high speed and produce clear images with high horizontal and vertical resolution.

A built-in frame memory provides three types of output signals, including a non-interlaced signal. While maintaining the benefit of Progressive Scan acquisition, these output signals provide complete system compatibility with existing video equipment. These CCDs utilise square pixels for minimum distortion of the image. Both models are ideal for computerised image processing applications, however the bayonet mount allows a wide selection of professional zoom lenses to be fitted.

- **Square pixels.**
- **Freeze function.**
- **Long term exposure 8 seconds.**
- **Spatial offset.**
- **Shutter speed selectable up to 1/10,000 s.**
- **External shutter trigger.**
- **Multiple output signals:**
  RGB, Y/C, composite, VGA (for DXC-9000).
- **Remote control by computer or external unit.**



110 g
Unit: mm

Specifications	DXC-9000	DXC-9100P
Pick up device	1/2-inch IT Progressive Scan CCD (x 3)	
Signal system	NTSC / VGA	PAL / N.I.
Picture elements	659 (H) x 494 (V)	782 (H) x 582 (V)
Lens mount	Bayonet mount	
Horizontal resolution	700 TV lines	800 TV lines
Video output	Composite, RGB, VGA, Y/C	Composite, RGB, SVGA, Y/C
External sync system	VBS, HD/VD	
Electronic shutter speed	8.0 ~ 1/10,000 s	8.0 ~ 1/10,000 s
S/N ratio	58 dB	57 dB
Min. illumination	15 lx (F1.4)	
Sensitivity	F5.6 (2000 lx)	
Power requirements	DC 12 V; 11.5W	
Regulations	FCC, CE	

XC-003 (NTSC)
XC-003P (PAL)

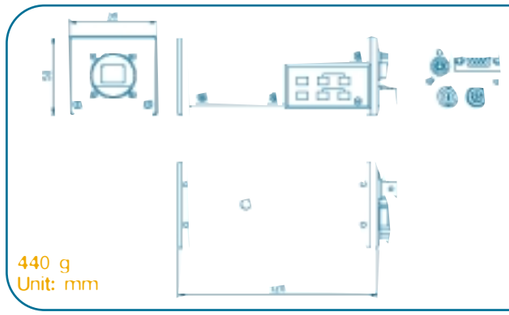
Outline

The XC-003P is a 3-CCD RGB colour camera module incorporating a 1/3-inch C mount and intended primarily for process control and image processing applications.

The design has been optimized to achieve the best possible quality RGB output. Prism separation gives high colour separation accuracy. Co-site sampling ensures perfect alignment of the three-colour information relative to each pixel.
And the purest possible RGB video processing, without picture enhancement, make it ideal for computer input.

- **Co-site sampling.**
- **E-Donpisha Asynchronous shutter.**
- **Restart / Reset function.**
- **Long term, low-noise integration.**
- **RGB, composite and Y/C video outputs.**
- **On-screen menu for function control.**
- **Fixed, Manual and One-push White balance.**
- **Colour bar generator.**
- **Optional C mount microscope adaptor, MVA-15**

(see pages 46, 47).



Specifications	XC-003	XC-003P
Pick up device	1/3-inch IT CCD (x 3)	
Signal system	NTSC	PAL
Picture elements	768(H) x 494 (V)	752 (H) x 582 (V)
Lens mount	C mount	
Horizontal resolution	570 TV lines in each R, G, and B channel	
Video Output	RGB, Y/C, composite	
External sync system	HD/VD, VS	
Electronic shutter speed	1/100 ~ 1/10,000 s	1/100 ~ 1/10,000 s
	1/1,000 ~ 1/12,000 s (Donpisha)	1/1,000 ~ 1/10,000 s (Donpisha)
S/N ratio	59 dB	58 dB
Min. illumination	3 lx (F2.2)	
Sensitivity	F5.6 (2000 lx)	
Power requirements	DC 12 V; 5.6 W	
Regulations	FCC, UL, CE	

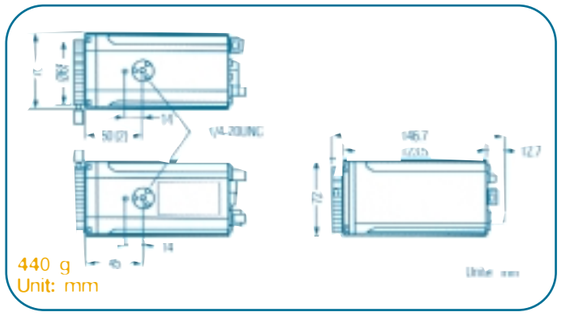
DXC-950 (NTSC)
DXC-950P (PAL)

Outline

The DXC-950P features a bayonet lens mount and uses 1/2-inch Sony IT Power HAD CCD for excellent sensitivity and extremely low vertical smear. The combination of spatial offset and the bayonet optical system provides high resolution and outstanding picture quality.

All functions are easily controlled from the camera's rear panel, with an optional RM-C950 Remote Control Unit or an external computer via an RS-232C interface. Multiple component, RGB, Y/C and composite video signal outputs allow the DXC-950P to be integrated into virtually any industrial video system.
Optional adaptors and couplers are available for mounting onto various types of microscope.

- **Y/C, RGB, Y/R-Y/B-Y, and composite video signal outputs.**
- **Linear matrix, shading compensation, master pedestal and gamma selection.**
- **Flash synchronization function.**
- **RS-232C interface.**
- **Full colour genlock**
- **CCD iris and adjustable window Auto Exposure.**
- **Fixed, One-push, Manual and Automatic White Balance.**
- **Colour shading matrix and painting connections.**
- **Two set up memories.**
- **Colour bar generator.**



Specifications	DXC-950	DXC-950P
Pick up device	1/2-inch IT CCD (x 3)	
Signal system	NTSC	PAL
Picture elements	768 (H) x 494 (V)	752 (H) x 582 (V)
Lens mount	Bayonet mount	
Horizontal resolution	750 TV lines	
Video output	RGB, Y/C, composite, Y/R-Y/B-Y	
External sync system	VBS, VS	
Electronic shutter speed	1/120 ~ 1/10,000 s	
S/N ratio	58 dB	
Min. illumination	5 lx (F1.4)	6.5 lx (F1.4)
Sensitivity	F9.5 (2000 lx)	F8.5 (2000 lx)
Power requirements	DC 12 V; 7.8 W	
Regulations	FCC	FCC, CE

XC-333 (NTSC) / XC-333P (PAL)
DXC-LS1/1 (NTSC) / DXC-LS1P/1 (PAL)

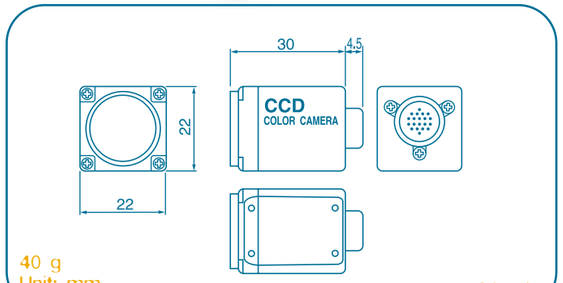
Outline

The XC-333P and DXC-LS1P/1 remote head colour cameras feature exceptionally high resolution performance in a small, rugged package. The square-section head of the XC-333P (Nf mount) offers greater resistance to shock and vibration and simplifies locating and fixing in systems. Often described as a "lipstick camera", the DXC-LS1P/1 (Ultra mount) achieves the smallest possible size using a cylindrical head.

Powerful, new generation DSP brings enhanced picture quality. A 3x digital zoom, as well as multiple automatic features make these cameras so easy to use.

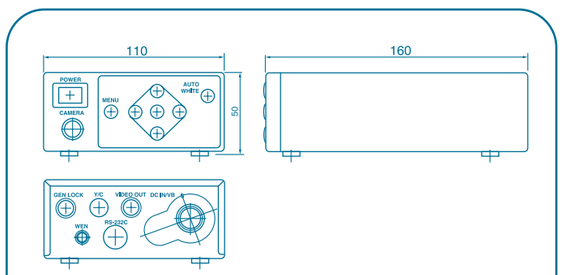
- **Miniature remote head and compact control unit.**
- **RS-232C remote control.**
- **Automatic exposure control with areas selection.**
- **3x electronic zoom.**
- **Colour bar generator.**
- **Title generator.**
- **Negative / Positive image function.**
- **Colour Matrix Technology for independent R, G and B adjustment.**
- **On-screen menu for function control.**
- **Variable gamma.**
- **Full colour genlock.**

XC-333P



40 g
Unit: mm

DXC-LS1/1



665 g Unit: mm

XC-333P

Specifications	XC-333	XC-333P	DXC-LS1/1	DXC-LS1P/1
Pick up device	1/4-inch IT CCD			
Signal system	NTSC	PAL	NTSC	PAL
Picture elements	768 (H) x 494 (V)	752 (H) x 582 (V)	768 (H) x 494 (V)	752 (H) x 582 (V)
Lens mount	Nf mount (convertible to C mount)		Ultra mount	
Horizontal resolution	470 TV lines	460 TV lines	470 TV lines	460 TV lines
Video output	Composite, Y/C			
External sync system	VBS			
Electronic shutter speed	1/100 ~ 1/40,000 s, CCD iris		1/60 ~ 1/40,000 s	1/50 ~ 1/40,000 s
S/N ratio	46 dB	44 dB	46 dB	44 dB
Min. illumination	10 lx (F1.2)			
Sensitivity	F5.6 (2000 lx)			
Power requirements	DC 12 V; 5 W		DC 9 ~ 12 V; 5 W	
Regulations	UL, FCC, CE, VCCI, C-Tick		UL, FCC, CSA	CE

XC-777A (NTSC) / XC-777AP (PAL)
XC-999 (NTSC) / XC-999P (PAL)

Outline

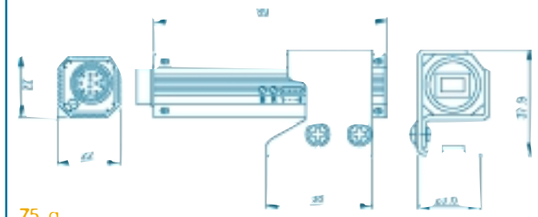
The XC-777AP is the 1/3-inch IT Hyper HAD CCD miniaturized version of the XC-999P, developed for applications where the length of the 1/2-inch XC-999P is a restriction. Both units provide the same high-quality images, though the XC-777AP offers an even more substantially reduced package, with lower weight and power consumption. These units are therefore ideal when these factors are critical - such as in battery-powered vehicles, pipe inspection, sport, and shooting under extreme conditions.

Both one-piece models are directly usable without an external unit. However the XC-999P features additional functions (full colour genlock, RGB output) when connected to a CMA-999P adaptor.

- **Single-piece camera, no separate CCU.**
- **Output switchable between composite and Y/C.**
- **ATW and manual white balance.**
- **Two fixed electronic shutter values and CCD iris switchable** (for XC-999P).
- **Optional accessory, CMA-999P connector** (see page 45).

XC-777AP

XC-999P



75 g
Unit: mm

XC-777AP

Specifications	XC-777A	XC-777AP	XC-999	XC-999P
Pick up device	1/3-inch IT CCD		1/2-inch IT CCD	
Signal system	NTSC	PAL	NTSC	PAL
Picture elements	768 (H) x 494 (V)	752 (H) x 582 (V)	768 (H) x 494 (V)	752 (H) x 582 (V)
Lens mount	Nf mount (convertible to C mount using optional LO-999CMT)			
Horizontal resolution	470 TV lines	460 TV lines	470 TV lines	460 TV lines
Video output	Composite, Y/C switch selected		Composite, Y/C switch selected. RGB with CMA-999/P	
Sync system	Internal		External HD/VD, VS. Composite with CMA-999/P connector	
Electronic shutter speed	Normal 1/100 s, 1/40,000 s, flickerless		Normal 1/100 s, CCD iris, flickerless	
S/N ratio	48 dB	46 dB	48 dB	46 dB
Min. illumination	4.5 lx (F1.2)			
Sensitivity	F5.6 (2000 lx)			
Power requirements	DC 12 V; 2.3 W		DC 9 ~ 12 V; 3.5 W	
Regulations	UL, FCC, CE, C-Tick			

XC-711 (NTSC)
XC-711P (PAL)

Outline

The XC-711P is a high-performance, RGB single-sensor colour 2/3-inch IT HAD CCD camera featuring square pixels (XC-711P only). Excellent colour separation is achieved with a primary colour, vertical stripe filter. As opposed to mosaic colour filters, full vertical colour resolution is preserved in the XC-711P.

This unit is an excellent colour input device for process control and image processing.

- **RGB primary colour stripe filter.**
- **RGB, composite and Y/C video outputs.**
- **Internal / external sync : HD/VD, VS Restart / Reset function.**
- **Alternative white balance modes: Manual, Preset** (3,200 / 5,600 K).
- **Auto White Tracing.**
- **Square pixels** (for XC-711P).
- **Dimensions and weight:** 50(W) x 56(H) x 149(D), 380 g

Specifications	XC-711	XC-711P
Pick up device	2/3-inch IT CCD	
Signal system	NTSC	PAL
Picture elements	768 (H) x 493 (V)	756 (H) x 581 (V)
Pixel size	17 µm x 11 µm	11 µm x 11 µm
Lens mount	C mount	
Horizontal resolution	330 TV lines	
Video output	RGB, composite, Y/C	
External sync system	VS, HD/VD	
Electronic shutter speed	1/125 ~ 1/10,000 s	1/60 ~ 1/10,000 s
S/N ratio	50 dB	48 dB
Min. illumination	25 lx (F1.4)	
Sensitivity	F4 (2000 lx)	
Power requirements	DC 12 V; 5.5 W	
Regulations	UL, FCC, CE	

DXC-107A (NTSC)
DXC-107AP (PAL)

Outline

The DXC-107AP is a compact 1/2-inch IT Hyper HAD CCD, colour, C mount camera suitable for industrial and medical applications. This model is equipped with a three-mode CCD iris function so that the automatic exposure control provides optimum exposure under difficult lighting conditions.

- **380,000 pixels (NTSC) / 440,000 (PAL).**
- **Auto White Balance.**
- **Auto Tracing White.**
- **Two preset modes: Indoor (3,200 K) or Outdoor (5,600 K).**
- **CCD iris function: Backlight / Spotlight / Standard modes.**
- **Y/C or composite video signal output.**
- **Multiplex single coaxial cable connection with CMA-D7/CE camera adaptor.**
- **Dimensions and weight:** 50 (W) x 55 (H) x 130 (D) mm, 360g.

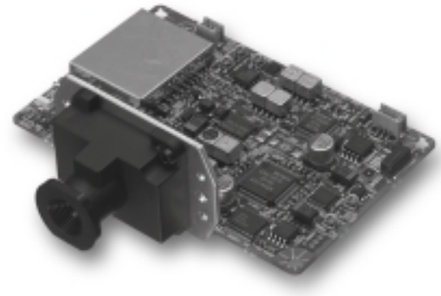
Specifications	DXC-107A	DXC-107AP
Pick up device	1/2-inch IT CCD	
Signal system	NTSC	PAL
Picture elements	768 (H) x 494 (V)	756 (H) x 582 (V)
Lens mount	C mount	
Horizontal resolution	470 TV lines	460 TV lines
Video output	Composite, Y/C	
External sync system	VS	
Electronic shutter speed	1/60 ~ 1/10,000 s, CCD iris	1/50 ~ 1/10,000 s, CCD iris
S/N ratio	48 dB	46 dB
Min. illumination	4.5 lx (F1.2)	
Sensitivity	F5.6 (2000 lx)	
Power requirements	DC 12 V; 3.3 W, using CCMC-12P cable	
Regulations	UL, FCC, CSA	CE

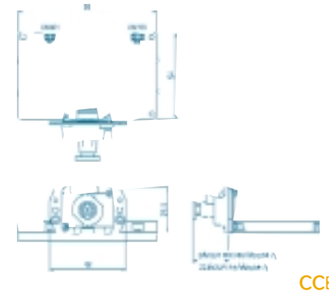
CCB-GC7YC (NTSC) / CCB-GC7YCP (PAL)
CCB-GL5 (NTSC) / CCB-GL5P (PAL)

Outline

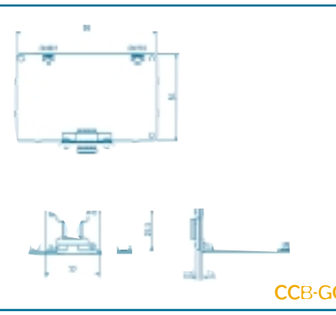
The CCB-GL5 and CCB-GC7 Series of colour board cameras offers excellent image quality in a compact, credit card design. The units, which comprise separate CCD and video processing boards, have been designed primarily for the desktop videoconferencing market but can be used in various other applications.

The DC power requirement for both types of camera is a wide ranging DC 7 V to 13 V, the onboard DC/DC converter supplying all internal voltage level needs. CCD iris and auto tracing white balance ensure the camera is able to automatically compensate for changes in scene illumination. The miniature CCD board can be remotely positioned up to 150 mm from the processing board, permitting its installation in confined areas and allowing flexibility in the design of the enclosure in which it will be used. The units are supplied with standard video outputs (CCB-GL5P - composite, CCB-GC7YCP - Y/C) but options are available, consult your local Sony office for details.
The CCB-GL5P is supplied as standard with a 6 mm, fixed iris lens which makes integration into systems even simpler.





- **Detachable CCD head.**
- **CCD iris and AGC functions (disconnectable).**
- **Auto Tracking White balance (disconnectable).**
- **Internal synchronization.**
- **Operates on DC 7V to 13V via internal DC/DC converter.**



Specifications	CCB-GL5	CCB-GL5P	CCB-GC7YC	CCB-GC7YCP
Pick up device	1/3-inch IT CCD			
Signal system	NTSC	PAL	NTSC	PAL
Picture elements	510 (H) x 492 (V)	500 (H) x 582 (V)	768 (H) x 494 (V)	752 (H) x 582 (V)
Horizontal resolution	330 TV lines		470 TV lins	
Video output	Composite		Y/C	
S/N ratio	46 dB			
Min. illumination	5 lx (F1.2)			
Power requirements	DC 7 ~ 13 v; 200 mA			

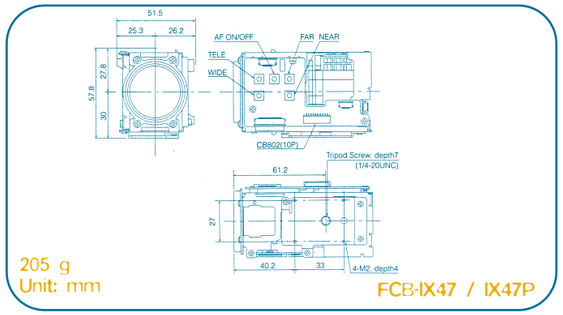
FCB-IX47 (NTSC) / FCB-IX47P (PAL)

new FCB-EX47L (NTSC) / FCB-EX47LP (PAL)

Outline

The FCB-IX47 and the FCB-IX47P are colour camera modules featuring a 1/4-inch Super HAD CCD and incorporating an 18x optical zoom and a 4x digital zoom. Sony DSP provides various picture effects and digital effects while a field memory provides a Slow Shutter function for increased sensitivity and a Freeze function. An RS-232C control interface enables the user to access all operational parameters. Iris, aperture, gain control, shutter, focus and zoom speed settings accommodate most applications. A six preset function allows these parameters to be stored and recalled. Low-light document stand, low-light photo booth are typical applications.

Enhanced versions of the FCB-IX47 and FCB-IX47P, the FCB-EX47L and FCB-EX47LP incorporate an adjustable vertical synchronisation capability on external TTL signal, thus extending the potential range of applications (security domes).



205 g
Unit: mm

FCB-IX47 / IX47P

- **DSP technology.**
- **18x zoom lens with improved zoom speed and auto focus modes.**
- **4x digital zoom.**
- **Field memory.**
- **Improved sensitivity by use of slow shutter function.**
- **Backlight / exposure compensation.**
- **Adjustable zoom and focus rates.**
- **VISCA control by RS-232C control with improved reaction speed (9,600 baud).**
- **Combinable picture / digital effects (VISCA): B/W, freeze function , left/right inversion, Luma key, half background freeze, movement analysis, mirror image.**
- **Negative / positive image switching.**
- **Monochrome image out capability.**
- **Built-in time, date and title generator with on screen display.**
- **External battery capability.**
- **Aperture control.**
- **External Synchronisation (V-lock)** (FCB-EX47L and FCB-EX47LP).

Specifications	FCB-IX47	FCB-IX47P	FCB-EX47L	FCB-EX47LP
Pick up device	1/4-inch IT CCD			
Signal system	NTSC	PAL	NTSC	PAL
Picture elements	768 (H) x 494 (V)	752 (H) x 582 (V)	768 (H) x 494 (V)	752 (H) x 582 (V)
Horizontal resolution	470 TV lines	460 TV lines	470 TV lines	460 TV lines
Lens	18x zoom, f 4.1 ~ 73.8mm, F1.4 ~ 3.0			
Digital zoom	4x (72x with optical zoom)			
Min. working distance	10 mm (wide end), 800 mm (tele end)			
White balance	Auto, ATW. One-push, manual, Indoor, Outdoor			
Video output	Composite, Y/C			
Sync system	Internal		Internal / External (V-lock)	
Electronic shutter speed	1/4 ~ 1/10,000 s	1/3 ~ 1/10,000 s	1/4 ~ 1/10,000 s	1/3 ~ 1/10,000 s
Min. illumination	3 lx (F1.4)			
S/N ratio	More than 50 dB			
Power requirements	DC 6 ~ 12 V; 300M mA			

Note: The "RS-232C Command List' and demonstration software for Windows 95 and Windows NT 4.0 are available upon request.
The software is available for evaluation and / or demonstration purposes only.
Use of this software with customer developed application software may damage hardware, application program and the camera.
Sony Corporation is not liable for any damages under these conditions.

FCB-IX470 (NTSC) / FCB-IX470P (PAL)

new FCB-EX470L (NTSC) / FCB-EX470LP (PAL)

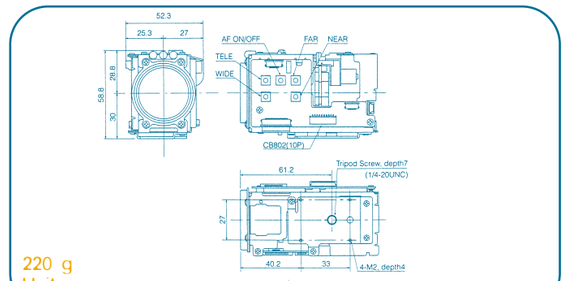
Outline

The FCB-IX470 and FCB-IX470P are the enhanced versions of the FCB-IX47P colour camera modules. They incorporate all the functionality of the FCB-IX47P models and add an IR sensitivity mode.

The FCB-EX470L and FCB-EX470LP incorporate an adjustable vertical synchronisation capability on external TTL signal, thus extending the potential range of applications such as night vision and law enforcement.

The FCB-IX470P and FCB-EX470LP are equipped with a motorized mechanism to remove the internal IR cut filter on demand, making the camera sensitive to close IR. An additional IR lighting may be added by switching the IR LEDs on. In this mode, these cameras can shoot without external light, achieving a minimum sensitivity of 0 lx.

Their outstanding performance allows these cameras to provide excellent pictures in all lighting conditions, even in darkness. The units are colour models, but switch to monochrome in Zero Lux Shot.



220 g
Unit: mm

FCB-IX470 / IX470P

- **0 lx sensitivity (Zero Lux Shot).**
- **Full picture control, including IR illumination.**
- **Built-in IR lighting allows working distances of 2 to 3 metres.**
- **See FCB-IX47P and FCB-EX47LP details for other functions (page 34).**

Specifications	FCB-IX470	FCB-IX470P	FCB-EX470L	FCB-EX470LP
Pick up device	1/4-inch IT CCD			
Signal system	NTSC	PAL	NTSC	PAL
Picture elements	768 (H) x 494 (V)	752 (H) x 582 (V)	768 (H) x 494 (V)	752 (H) x 582 (V)
Horizontal resolution	470 TV lines	460 TV lines	470 TV lines	460 TV lines
Lens	18x zoom, f 4.1 ~ 73.8mm, F1.4 ~ 3.0			
Digital zoom	4x (72x with optical zoom)			
Min. working distance	10 mm (wide end), 800 mm (tele end)			
White balance	Auto, ATW. One-push, manual, Indoor, Outdoor			
Video output	Composite, Y/C			
Sync system	Internal		Internal / External (V-lock)	
Electronic shutter speed	1/4 ~ 1/10,000 s	1/3 ~ 1/10,000 s	1/4 ~ 1/10,000 s	1/3 ~ 1/10,000 s
Min. illumination	0 lx (F1.4), IR CUT OFF, IR LED ON			
	0.2 lx (F1.4), IR CUT OFF, IR LED OFF			
S/N ratio	More than 50 dB			
Power requirements	DC 6 ~ 12 V; 300M mA			

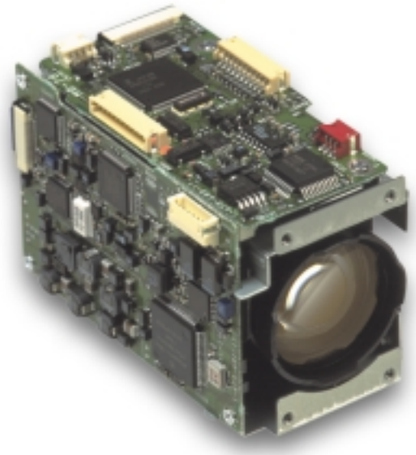
EVI-400 (NTSC) / EVI-401 (PAL)

new

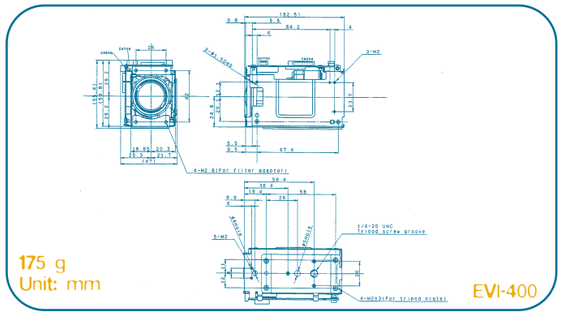
EVI-400DR (NTSC) / EVI-401DR (PAL)

Outline

The EVI-400 and EVI-401 are new colour camera blocks which combine a 1/3-inch Super HAD CCD (380,000 / 440,000 pixels NTSC/PAL) with a 12x optical zoom. Several new functions and improvements have been included in these models to widen the scope of their application and they are ideal for security, electronic photography and vision aid.
An EEPROM chip stores the pre-programmed factory default camera settings, so these are maintained without battery backup. In addition to a standard RS-232C port, a TTL voltage-level serial interface is provided for control.
The EVI-400DR and EVI-401DR provide additional features that include a digital zoom with a standard 2x zoom (max. 8x) and a V-lock function that extends their potential range of applications by allowing remote synchronisation.



- **1/3-inch, 380K / 440K pixel Super HAD CCD.**
- **High sensitivity** (1 lx at 50 IRE).
- **12x optical zoom.**
- **2x (max. 8x) digital zoom (EVI-400DR / EVI-401DR).**
- **Improved Focus and Auto Exposure (AE) modes.**
- **External synchronisation, V-lock (EVI-400DR / EVI-401DR).**
- **5 position presets and factory default preset (EEPROM), permanent memory** (no battery).
- **VISCA control by RS-232C or direct interface (TTL).**
- **2 analogue inputs and 2 analogue control outputs** (user programmable).
- **Min. working distance 10 mm (wide end), 800 mm** (tele end).



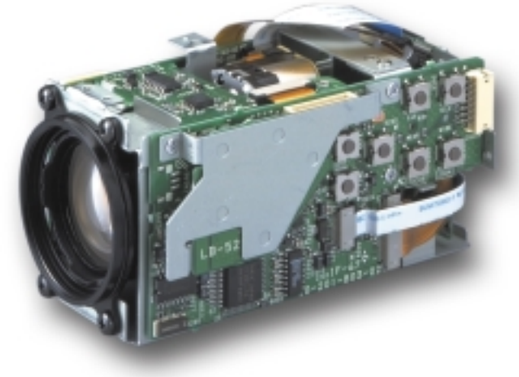
Specifications	EVI-400	EVI-401	EVI-400DR	EVI-401DR
Pick up device	1/3-inch IT CCD			
Signal system	NTSC	PAL	NTSC	PAL
Picture elements	768 (H) x 494 (V)	752 (H) x 582 (V)	768 (H) x 494 (V)	752 (H) x 582 (V)
Horizontal resolution	460 TV lines	450 TV lines	460 TV lines	450 TV lines
Lens	12x zoom, f 4.5 ~ 64.8mm, F1.8 ~ 2.7, wide macro, auto focus (inner focus system)			
Focus	Auto focus, Manual focus, One-push trigger AF, Zoom trigger AF, Interval AF			
Digital zoom	-		2x (total 24x with optical zoom)	
	-		2x (total 96x with optical zoom)	
White balance	ATW. One-push, manual, Indoor, Outdoor			
Video output	Composite, Y/C			
Sync system	Internal		Internal / External	
Electronic shutter speed	1/60 ~ 1/10,000 s	1/50 ~ 1/10,000 s	1/60 ~ 1/10,000 s	1/50 ~ 1/10,000 s
S/N ratio	More than 48 dB			
Min. illumination	1 lx (F1.8)			
Power requirements	DC 6 ~ 12V; 2.4 W (3.2W active motor)		DC 6 ~ 12V; 2.6 W (3.5W active motor)	

EVI-370 (NTSC)

EVI-371 (PAL)

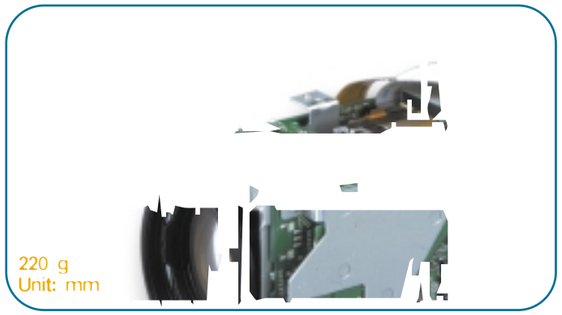
Outline

The EVI-370 and EVI-371 are each available in no less than three variations which, together with a very full list of built-in features, makes them suitable for use in a wide variety of applications. Fitted with a 12x optical zoom lens as standard, other models are available which add a 2x digital zoom and genlock.



- **12x optical zoom lens**
- **VISCA / RS-232C remote control (9,600 baud)**
- **Switch board remote control** (via optional accessory, FK-69 Remote Control Board)
- **Continuous camera data output (VISCA)**
- **Time and date generator with On-screen display (selectable)**
- **6 preset memories of camera set up**
- **12-week memory back up**
- **Analogue voltage output for zoom position indication**
- **Variations**

- EVI-370D (NTSC) and EVI-371D (PAL) add a 2x digital zoom
- EVI-370DG (NTSC) and EVI-371DG (PAL) add a 2x digital zoom and full colour genlock (VBS)



Specifications	EVI-370	EVI-371
Pick up device	1/3-inch IT CCD	
Signal system	NTSC	PAL
Picture elements	768 (H) x 494 (V)	752 (H) x 582 (V)
Lens mount	12x zoom, f5.4 ~ 64.8 mm, F1.8 ~ 2.7, wide macro, auto focus (inner focus system)	
Angle of view	Approx. 4.3 ~ 48.8°	
White balance	3200 K, 5600 K, One-push, ATW	
Horizontal resolution	460 TV lines	450 TV lines
Video output	Composite, Y/C	
Electronic shutter speed	1/60 ~1/10,000 s	1/50 ~ 1/10,000 s
S/N ratio	48 dB	
Min. illumination	7 lx (F1.8)	
Power requirements	DC 6 ~ 12 V; 2.4 ~3.4 W	

EVI-D30 (NTSC)

EVI-D31 (PAL)

Outline

The EVI-D30 and EVI-D31 combine a high quality 1/3-inch CCD colour camera with a sophisticated pan and tilt base. They form attractive packages that are ideal for video communication and general surveillance applications. Control of the camera is via RS-232C or using the supplied infrared remote commander.

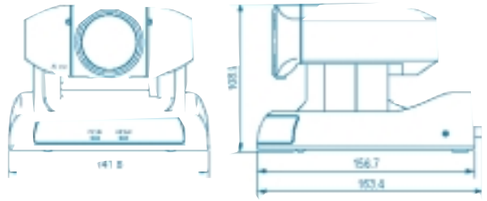
Two intelligent features set these units apart from many other currently available cameras - Auto Tracking (AT) and Motion Detection (MD).

AT Mode (AT). The Auto Tracking mode is particularly useful in videoconferencing applications, where a subject is liable to move around the scene. AT operates by the user defining an area of the camera picture that contains the subject to be followed. This area is then analysed by the AT system to pick out pixels of similar colour and brightness around the subject. This information is then used in two ways. It is fed to a Pan and Tilt function that controls the pan and tilt motors so that the camera automatically follows the movement of the subject. The information is also used for the Auto Zoom function, this controls the zoom lens so that, within the limits of zoom range, the size of the subject remains constant.

The AT mode also uses exposure and advanced backlight compensation systems to ensure that the brightness level of the subject remains as constant as possible, even under harsh backlight conditions. Because the subject position is known, a comparison can be made between its brightness and that of the background. The camera then automatically compensates for the lighting conditions.

Motion Detection (MD). The Motion Detection mode detects motion in two user-defined areas of the scene. Unlike conventional MD techniques that rely on brightness changes, the EVI-D30 and EVI-31 use both brightness and colour information to detect movement. This makes it effective even when the object and the background have the same brightness level. Both brightness and colour detection settings can be adjusted and, when motion has been detected within a window, an alarm signal is output which can be used, for example, to start a VCR recording.

- **Composite and Y/C video outputs.**
- **High-speed, wide-range pan and tilt head.**
- **High-speed auto focus.**
- **Microphone input and audio output.**
- **Six position Preset function.**
- **Auto tracing, one-push hold, indoor and outdoor white balance.**
- **Automatic Tracking (AT).**
- **Colour and brightness Motion Detection (MD).**
- **RS-232C serial control (VISCA).**
- **IR remote commander.**
- **Time and date generator.**
- **Supplied accessories**
  - AC power adaptor.
  - IR remote commander.
  - A/V cable.



110 g
Unit: mm

Specifications	EVI-D30	EVI-D31
Pick up device	1/3-inch IT CCD	
Signal system	NTSC	PAL
Picture elements	768 (H) x 492 (V)	752 (H) x 585 (V)
Horizontal resolution	460 TV lines	450 TV lines
Lens	12x power zoom, f=5.4 to 64.8 mm, F=1.8 to 2.7	
Angle of view (H)	Approx. 48.8° (wide end) to 4.4° (tele end)	
White balance	ATW, One-push, 3,200 K, 5,600 K	
Video output	Composite, Y/C	
Electronic shutter speed	1/60 ~ 1/10,000 s	1/50 ~ 1/10,000 s
S/N ratio	48 dB	
Pan/Tilt	H (± 100° - max speed 80°/ s), V (± 25° - max speed 50°/ s)	
Min. illumination	7 lx (F1.8)	
Power requirements	DC 12 ~ 14 V ; 10.5 W	
Regulations	UL, FCC, CE, VCCI	

EVIS-D30PE

Outline

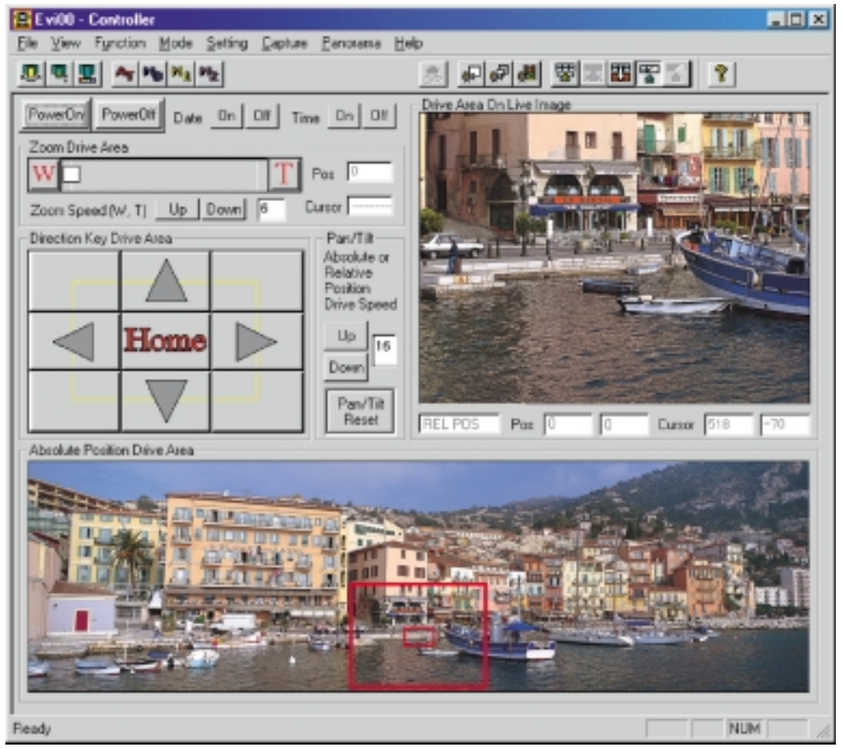
The EVIS-D30PE is Windows 95 software that enables still panoramic images to be created using an EVI-D30 or EVI-D31 pan / tilt camera. An associated PC only requires to be fitted with a video capture board and a RS-232C link. To form a panoramic shot, the PC controls the camera pan and tilt head so that images are captured at several different camera positions. These images are then combined into a single large picture. The software displays two windows, in one the active camera picture is shown while in the second the panoramic picture is displayed. Clicking the mouse inside the panoramic picture automatically repositions the camera to display this selected area as the active window. Full control of the camera is provided, including Auto Tracking and Motion Detection modes. Automatic picture grabbing can be triggered by the Motion Detection function.

Panorama functions are available for developers as Software Development Kit (SDK): EVIS-D30PME (as SDK) and EVIS-D30PME/S (sample application). Please contact your local Sony sales office.

Required components:

- **Video Capture Board featuring**
  - 320 (H) x 240 (V).
  - AVI, DIB (RGB 24 bit) file.
  - Overlay display (recommended).
- **RS-232C link.**

Note: the EVIS-D30PE Panorama software can be downloaded from the Sony web site (for further detail please contact your local Sony sales office).



EVI-R10 (NTSC) / EVI-R11 (PAL)
EVI-R50 (NTSC) / EVI-R51 (PAL)

Outline

The attractive appearance of these camera modules makes them ideally suited to their primary role within desktop video communication systems. Excellent image quality is output via the composite or Y/C connectors on the rear of the unit, together with audio received through the integral microphone. The flexible arm allows both a face and documents to be imaged, as the camera head can be rotated by 90˚. The EVI-R50 and EVI-R51 are longer neck versions providing an A4 shooting area.

- **Composite and Y/C video outputs.**
- **CCD iris.**
- **Adjustable lens focus and iris.**
- **Macro shooting.**
  (10 mm minimum object distance)
- **Flexible neck.**
- **Integral microphone.**
- **Dimensions and weights.**
  - body 93 (W) x 43 (H) x 134 (D) mm
  - camera head 25 (W) x 22 (H) x 73 (D) mm
  - arm 248 mm (EVI-R10/11), 500 mm (EVI-R50/51)
  - 650 g (EVI-R10/11), 700 g (EVI-R50/51)
- **Supplied accessories.**
  - AC power adaptor
  - A/V cable

Specifications	EVI-R10 / EVI-R50	EVI-R11 / EVI-R51
Pick up device	1/4-inch IT CCD	
Signal system	NTSC	PAL
Picture elements	512 (H) x 494 (V)	500 (H) x 582 (V)
Lens mount	f=3.9 mm, F=1.8, from 10 mm to ∞	
Angle of view (H)	50°	
White balance	ATW	
Horizontal resolution	More than 300 TV lines	
Video output	Composite, Y/C	
Electronic shutter speed	1/60 ~ 1/10,000 s	1/50 s
S/N ratio	46 dB	
Min. illumination	9 lx (F1.8)	
Power requirements	DC 6 V; 1.8 W	
Regulations	FCC, CE	

EVI-G20 (NTSC) / EVI-G21 (PAL)

Outline

The EVI-G20 and EVI-G21 are the perfect choice for small group desktop conferencing applications. The 3x auto focus zoom lens and fast internal pan and tilt mechanism provide these cameras with the flexibility to show an overall group in addition to individual people. Full control of the camera is either from the remote infrared commander or via the RS-232C port, commands being common to the EVI-D30 and EVI-D31.

- **3x auto focus zoom lens.**
- **Auto tracing, one-push mode, indoor and outdoor white balance.**
- **CCD iris.**
- **3-position preset functions.**
- **RS-232C serial control (VISCA).**
- **IR remote control.**
- **Internal pan and tilt movements.**
- **Dimensions and weight:** 84 (W) x 69 (H) x 142 (D) mm, 450 g.
- **Supplied accessories.**

- AC power adaptor - IR remote commander - A/V cable.

Specifications	EVI-G20	EVI-G21
Pick up device	1/4-inch IT CCD	
Signal system	NTSC	PAL
Picture elements	768 (H) x 492 (V)	768 (H) x 492 (V)
Horizontal resolution	460 TV lines	450 TV lines
Lens	3X powered zoom, f=4.5 ~ 13.5 mm, F2.3 ~ F4.1	
Angle of view (H)	15 to 45°	
Electronic shutter speed	1/60 ~ 1/10,000 s	1/50 ~ 1/10,000 s
S/N ratio	45 dB	
Pan /Tilt	H(±30° - max speed 150°/s) V (± 15° - max speed 150°/s)	
Min. illumination	16 lx (F2.3)	
Power requirements	DC 9 V; 2.3 W	
Regulations	FCC, CE, VCCI	

VID-P50 (NTSC) / (PAL)

new

Outline

The VID-P50 is a lightweight, compact and portable video presentation stand. Easy to set up and to operate, it is designed for videoconferencing, education and office presentation purposes.

- **12x powered zoom with two zoom speeds.**
- **Auto focus, iris and white balance.**
- **Single, replaceable, fluorescent light.**
- **Composite and Y/C video outputs.**
- **Flip and tilt camera head (up to 90 degrees). Swing-out close-up lens.**
- **Rotating arm / camera head for shooting 3-D objects and wall-mounted material.**
- **Compact and lightweight:**
  335 (W) x 70 (D) x 550 (H) mm (folded), 4.1 kg.

VID-P50

VID-P110 (NTSC) / (PAL)
VID-P150 (NTSC) / (PAL)

new

Outline

The fully-featured VID-P110 unit includes twin fluorescent arm lights plus a built-in backlight. Two frame memories allow pictures to be frozen and the object then removed. Its excellent picture quality and features make it perfect for presentations, distance learning, telemedicine or high quality videoconferencing.

The VID-P150 model has the additional benefit of a completely motorised camera head with RS-232C control. It has eight direction remote controls (including a Home Position function) and four pattern memories. An accessory shoe is provided for an optional preview monitor.

- **Motorized camera head with RS-232C port for PC control** (VID-P150 only).
- **Four pattern memories store pan/tilt, lighting and camera settings** (two on VID-P110).
- **Built-in, A4-size backlight.**
- **Enhanced control panel.**
- **One-push, All-reset and Negative modes.**
- **Compact and lightweight:**
  - 446 (W) x 186 (H) x 634 (D) mm (folded)
  - VID-P110: 8 kg; VID-P150: 8.8 kg

VID-P110

Motorized range of VID-P150	Pan	Tilt
Document mode	± 30° from vertical	± 20° from vertical
Flip-up mode	± 100° from horizontal	± 20° from horizontal

Specifications	VID-P50	VID-P110	VID-P150
Pick up device	1/3-inch IT CCD		
Signal system	NTSC	PAL	NTSC / PAL / NTSC / PAL
Picture elements	768 (H) x 494 (V) for NTSC 752 (H) x 582 (V) for PAL		
Horizontal resolution	460 TV lines for NTSC 450 TV lines for PAL		
Document shooting area	300 x 225mm (WIDE) 25 x 19mm (TELE)	325 x 240mm (WIDE) 29 x 22mm (TELE)	325 x 260mm (WIDE) 31 x 23mm (TELE)
S/N ratio	48 dB	46 dB	48 dB / 46 dB / 48 dB / 46 dB
Lens	F1.8 ~ 2.7, f=5.4 ~ 64.8 mm ; 12x powered zoom		
Pattern memory	N/A	2 in document mode + 2 in flip-up mode	2 in document mode + 2 in flip-up mode
Zoom	1 speed	2 speeds	
Light	1 x 4 W fluorescent	2 x 9 W fluorescent + 1 2.5 W backlight	
Power consumption	1 A / 0.15 A	3 A / 0.3 A	3 A / 0.3 A
Power requirements	AC 120 V for NTSC AC 230 V for PAL		

		CCB-M25 / CCB-M25CE	CCB-M27B / CCB-M27BCE	CCB-M35A / CCB-M35ACE	CCB-M37 / CCB-M37CE	CCB-ME37 / CCB-ME37CE	CCB-ME47 / CCB-ME47CE	CCB-MS57CE	XC-55	XC-55BB	XC-73 / XC-73CE	XC-75 / XC-75CE	XC-7500 / XC-8500CE	XCD-SV900	XCD-X700	XC-E150 / XC-E130CE	XC-E250 / XC-E250CE	XC-E530 / XC-E530CE	XC-E550 / XC-E550CE	XCH-1125	XC-ST50 / XC-ST50CE	XC-ST50 / XC-ST50CE
Type	Progressive Scan								●	●			●	●	●							
	HDVS																			●		
CCD	1/4-inch						●															
	1/3-inch			●	●	●		●	●	●	●					●		●			●	
	1/2-inch	●	●						●			●	●	●	●		●		●			●
	2/3-inch																					●
	1-inch																			●		
	3-CCD																					
	Square Pixels								●	●			●	●	●							
Lens Mount	C								●		●	●	●	●	●	●	●	●	●	●	●	●
	Nf									●												
	Ultra																					
	Bayonet																					
Built-in Lens	Manual Focus																					
	Zoom Ratio																					
	Auto Focus																					
Output Signal	VS	●	●	●	●	●	●	●	●	●	●	●	●							●		
	VBS																					
	RGB																					
	Y/C																					
	VGA format												●1									
	SVGA format												PAL only (1)									
	2N: non interlaced												●									
	1N: non interlaced								●	●			●									
	2I:interlaced												PAL only									
	1I:interlaced								●	●												
	High Rate Scan												●1									
	Digital IEEE 1394													●	●							
External sync. System	HD / VD					●	●		●	●	●	●	●							●	●	●
	VS										●	●	●							●	●	●
	Full colour genlock																					
	V-lock																					
Long Term Exposure									●	●	●	●	●							●		
Shutter	Normal	●	●	●	●	●	●	●	●	●	●	●	●							●	●	●
	Restart Reset								●	●	●	●	●			●	●	●	●	●	●	●
	Flexible Trigger Shutter								●	●	●	●	●	●	●	●	●	●	●	●	●	●
	Slow Speed Shutter																					
CCD iris																				●		
White Balance	ATW																					
	One-push																					
	Fixed																					
	Manual																					
Others	Pan Tilt Zoom																					
	Remote Head									●												
	Negative / Positive																					
	E-Zoom																					
	RS-232C Control																					
	Power Saving					●	●	●														
	Quick Start					●	●	●														
	Auto Tracking																					
	Motion Detector																					
	Stabiliser																					
	Print Trigger																					
	Date Time Display																					
	Zero Lux Shot																					
Page		20	20	20	20	19	19	19	13	13	17	17	14	12	12	16	16	16	16	18	15	15	15

● 1 connected to CMA-87

		CCB-GC7V / CCB-GC7VCP	CCB-GL5 / CCB-GL5P	COM-DS250	DFW-V300	DFW-V500	DFW-VL500	DXC-107A / DXC-107AP	DXC-9000 / DXC-9100P	DXC-950 / DXC-950P	DXC-LS1/1 / DXC-LS1P/1	EVI-370 / EVI-371	EVI-370D / EVI-371D	EVI-370DG / EVI-371DG	EVI-400 / EVI-401	EVI-400DDR / EVI-401DR	EVI-D30 / EVI-D31	EVI-G20 / EVI-G21	EVI-R10 / EVI-R11 / EVI-R50 / EVI-R51	FCB-EX470L / FCB-EX470LP	FCB-EX47L / FCB-EX47LP	FCB-H470 / FCB-H470P	FCB-H47 / FCB-H47P	XC-003 / XC-003P	XC-333 / XC-333P	XC-111 / XC-111P	XC-777A / XC-777AP	XC-999 / XC-999P
Type	Progressive Scan					●	●		●																			
	HDVS																											
CCD	1/4-inch									●								●	●	●	●	●	●		●			
	1/3-inch	●	●	●		●	●				●	●	●	●	●	●										●		
	1/2-inch				●			●	●	●																		●
	2/3-inch																								●			
	1-inch																											
	3-CCD							●	●															●				
	Square Pixels					●	●	●																				
Lens Mount	C				●	●		●																●	●	PAL ONLY		
	Nf																									●	●	●
	Ultra									●																		
	Bayonet							●	●																			
Built-in Lens	Manual Focus	●															●											
	Zoom Ratio		x12			x12				x12	x12	x12	x12	x12	x12	x3		x18	x18	x18	x18							
	Auto Focus									●	●	●	●	●	●	●		●	●	●	●							
Output Signal	VS																											
	VBS		●					●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	RGB							●	●															●		●		●1
	Y/C	●						●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
	VGA format							DXC-9000																				
	SVGA format							DXC-9100P																				
	2N: non interlaced																											
	1N: non interlaced							●																				
	2I:interlaced									ol only																		
	1I:interlaced																											
	High Rate Scan																											
	Digital IEEE 1394			●	●	●	●																					
External sync. System	HD / VD							●																●		●		●
	VS							●																●	●	●		●
	Full color genlock							●	●				●											●				●1
	V-lock														●			●	●									
Long Term Exposure						(●)	(●)	●	●	●								(●)	(●)	(●)	(●)	●	●	●				
Shutter	Normal	●	●	(●)	(●)	(●)	(●)	●	●	●	(●)	(●)	(●)			(●)	(●)		(●)	(●)	(●)	(●)	●	●	●	●	●		
	Restart Reset																						●		●			
	Flexible Trigger Shutter					●	●	●															●					
	Slow Speed Shutter							●										●	●	●	●							
CCD iris		●	●			(●)	(●)	●	●	●	(●)	(●)	(●)			(●)	●	●	(●)	(●)	(●)		●				●	
White Balance	ATW	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●		●	●	●	●	●	
	One-push			(●)	(●)	(●)	(●)	●	(●)	(●)	●	(●)	(●)	(●)	●	●	(●)		●	●	●	●	●	●				
	Fixed	●	●	(●)	(●)	(●)	(●)			●	(●)	(●)	(●)	●	●	(●)	(●)		●	●	●	●	●	●	●	●	●	
	Manual			(●)	(●)	(●)	(●)		(●)	(●)	●								●	●	●	●	●	●	●	●	●	
Others	Pan Tilt Zoom			●3												●	●											
	Remote Head									●								●					●					
	Negative / Positive									●									●	●	●	●	●					
	E-Zoom									x3		x2	x2		x2-8				x4	x4	x4	x4		x3				
	RS-232C Control							●	●	●	●	●	●	●	●	●	●		●	●	●	●		●				
	Power Saving																											
	Quick Start																											
	Auto Tracking															●												
	Motion Detector															●												
	Stabiliser																											
	Print Trigger																											
	Date Time Display								●		●	●	●	●	●				●	●	●	●		(●)				
	Zero Lux Shot								(●)										●			●						
Page		33	33	23	22	22	22	32	27	29	30	37	37	36	36	38	40	40	35	34	34	35	28	28	32	31	31	

●1 connected to CMA-999/999P ●2 connected to IF-51 ●3 using camera stand (option) (●) external contr

Accessory	Reference	Description	Colour: 3x 1/2-inch CCD DXC-9100P	Colour: 3x 1/2-inch CCD DXC-950P	Colour: 1/2-inch CCD DXC-107AP	Colour: 1/4-inch CCD DXC-LS1P/1
Bayonet mount lens	VCL-707BXM	Manual macro zoom lens f=7.5 - 52.5mm ; F1.6	●	●		
	VCL-717BXEA	Adaptable zoom lens remote controlable from RM-C950 ; f=7 - 119mm ; F1.4	●	●		
	YH18x6.7KTS B	Adaptable zoom lens remote controlable from RM-C950 (CANON) ; f=6.7 -121mm ; F1.4	●	●		
C mount zoom lens	VCL-1106YM	Adaptable zoom lens f=7.5 -52.5mm ; F1.6			●	
	VCL-06XK	Manual iris lens f=6 mm ; F1.2			●	
Mount adaptator	LO-32BMT	2/3-inch lens mount adaptor	●	●		
	LO-UCMT	C mount to Ultra mount adaptor				●
Ultra mount lens	VCL-04UVM	f=4 mm				●
	VCL-12UVM	f=12 mm				●
Microscope adaptor	MVA-12				●	
	MVA-40	With auto iris	●	●		
	MVA-41A	**Cable**	●	●		
	MVA-265	Surgical type (one way)	●	●		
AC Camera adaptor	CMA-D2CE	19-inch Rackable 12 V power supply and video signal transmitter over CCMC 12pin cable	●	●	●	●
	AC-E90HG	Surgical type (one way)				●
Remote control unit	RM-C950	Allow to control all camera functions including zoom/focus/iris through RS-232C interface	●	●		
Coupler	MVAC-33-N	Coupler for NIKON X/Y Series microscope	●	●	●	
	MVAC-33-SM	Coupler for NIKON SMZ-10 Series microscope	●	●	●	
	MVAC-33-O	Coupler for OLYMPUS BH-2/AH Series microscope	●	●	●	
	CCMC-16P3	CCU to CHU cable (3m)				●
	CCMC-16P10	CCU to CHU cable (10m)				●
	CCDC-5	12 pin <> 4 pin DC cable (5m)	●	●	●	●
	CCDC-10	12 pin <> 4 pin DC cable (10m)	●	●	●	●
	CCDC-25	12 pin <> 4 pin DC cable (25m)	●	●	●	●
	CCDC-50	12 pin <> 4 pin DC cable (50m)	●	●	●	●
	CCDC-100	12 pin <> 4 pin DC cable (100m)	●	●	●	●
	CCMC-12P02	12 pin <> 12 pin multi core cable (2m)	●	●	●	●
	CCMC-12P05	12 pin <> 12 pin multi core cable (5m)	●	●	●	●
	CCMC-12P10	12 pin <> 12 pin multi core cable (10m)	●	●	●	●
	CCMC-12P25	12 pin <> 12 pin multi core cable (25m)	●	●	●	●
	CCXC-9DD	9 pin D-sub <> 9 pin D-Sub RGB Cable (5m)	●	●		
	CCXC-9DB	9 pin D-sub <> 5 BNC RGB Cable (5m)	●	●		
	CCXC-9DS	9 pin D-sub <> 4 BNC RGB Cable (5m)	●	●		
	CCMC-9DSMN	9 pin D-sub <> 3 BNC +Din 4pin+Mini Jack RGB Cable (5m)	●	●		

			B/W: 1/3-inch CCD XC-55	XC-55BB	XC-73 / XC-73CE	XC-E150 / XC-E150CE	XC-E530 / XC-E530CE	B/W: 1/2-inch CCD XC-ST30 / XC-ST30CE	XC-7500 / XC-8500CE	XC-75 / XC-75CE	XC-E150 / XC-E150CE	XC-E530 / XC-E530CE	XC-ST50 / XC-ST50CE	B/W: 2/3-inch CCD XC-ST70 / XC-ST70CE	B/W: 1-inch CCD XCH-1125	Colour: 1/4-inch CCD XC-333 / XC-333P	Colour: 1/3-inch CCD XC-003 / XC-003P	Colour: 1/2-inch CCD XC-777A / XC-777AP	Colour: 1/2-inch CCD XC-999 / XC-999P	Colour: 2/3-inch CCD XC-711 / XC-711P
Accessory	Reference	Description																			
Camera Cables	CCXC-H12P05	XCH to JB-77 cable 5m													●						
	CCXC-H20P05	XCH to MSI cable 5m													●						
	CCXC-12P02N	EIAJ 12p - 2m	●	●	●	●	●	●	●	●	●	●	●	●			●	●	●	●	
	CCXC-12P05N	EIAJ 12p - 5m	●	●	●	●	●	●	●	●	●	●	●	●			●	●	●	●	
	CCXC-12P10N	EIAJ 12p - 10m	●	●	●	●	●	●	●	●	●	●	●	●			●	●	●	●	
	CCXC-12P10N	EIAJ 12p - 25m	●	●	●	●	●	●	●	●	●	●	●	●			●	●	●	●	
RGB Cables	CCXC-9DB	9 pin male - 5m															●		●	●	
	CCXC-9DD	9 pin male - 5m															●		● CMA-999/P	●	
Trigger Cable	CCXC-6P05	6P male - female cable 5m							●												
CCU-CHU Cables	CCXC-T20P02	2m		●												●					
	CCXC-T20P05	5m														●					
	CCXC-T20P10	10m														●					
	CCXC-20P20	remote head extension - 20m																			
Tripod Adaptor	VCT-37	metal, for small C mount			●				●	●											
	VCT-77RR	metal																			
	VCT-75I	plastic, for C mount			●				●	●											
	VCT-333I			● (CHU)		●	●		CMA-999/P		●	●				● (CHU)					
	VCT-55I		●	● (CHU)																	
	VCT-ST70I	non conductive						●					●	●							
Junction Box	JB-77	12p cable split	●	●	●			●	●						●	●	●	●	●	●	
Connector	PC-XC03	spare male 3p																●	●		
	PC-XC04	spare male 4p													●					●	
	PC-XC06	spare male 6p			●				●	●					●		●				
	PC-XC012	spare male 12p	●	●	●				●	●						●	●	●	●	●	
Angle Kit	XCK-L777																	●	●		
Camera Adaptor	DC-777/CE		●	●	●				● without CMA-87	●						●	●	●	● Without CMA-999/P	●	
	DC-77RR/CE		●	●	●				● with CMA-87	●						●	●	●	● With CMA-999/P	●	
	DC-700/CE		●	●	●	●	●	●	●	●	●	●	●			●	●	●	●	●	

CHU **Camera Head Unit**

CCU **Camera Control Unit**

			Colour	B/W						Colour		B/W						Colour	Colour	B/W
			1/4-inch CCD	1/3-inch CCD						1/3-inch CCD		1/2-inch CCD							2/3-inch CCD	
			XC-333 XC-333P	XC-73 XC-73CE	XC-EI30 XC-EI30CE	XC-ES30 XC-ES30CE	XC-ST30 XC-ST30CE	XC-55	XC-55BB	XC-777A XC-777AP	XC-003 XC-003P	XC-7500 XC-8500CE	XC-75 XC-75CE	XC-EI50 XC-EI50CE	XC-ES50 XC-ES50CE	XC-ST50 XC-ST50CE	XC-999 XC-999P	XC-711 XC-711P	XC-ST70 XC-ST70CE
Accessory	**Reference**	**Description**																		
C mount lens	VCL-08YM	f=8mm		32.6°x24.8°								42.6°x32.6°						56.4°x42.6°	
	VCL-12YM	f=12mm	*17.0°x12.8°	22.4°x16.9°					*22.4°x16.9°			29.6°x22.4°					*29.6°x22.4°	39.9°x30.5°	
	VCL-16Y-M	f=16mm		17.0°x12.8°								22.6x17.0°						30.7°x23.3°	
	VCL-25Y-M	f=25mm		11.0°x8.2°								14.6°x11.0°						20.0°x15.0°	
	VCL-50Y-M	f=50mm	*4.1°x3.1°	5.5°x4.1°					*5.5°x4.1°			7.3°x5.5°					*7.3°x5.5°	10.1x7.6°	
	VCL-08WM	f=8mm for 3 CCD									33.24°x25.22°								
	VCL-16WM	f=16mm for 3 CCD									17.04°x15.50°								
	VCL-25WM	f=25mm for 3 CCD									10.58°x8.14°								
	25MM HD lens	for HD camera																	
C mount macro lens	VCL-M45YM	X0.5		3.69°x6.57°					*3.69°x6.57°		3.69°x6.57°	5.36°x4.02°					*5.36°x4.02°	7.37°x4.53°	
		X1.0		2.79°x2.07°					*2.79°x2.07°		2.79°x2.07°	4.05°x3.04°					*4.05°x3.04°	5.57°x4.18°	
	50MM macro lens	X0.8		3.1°x2.3°					*3.1°x2.3°		3.1°x2.3°	4.1°x3.1°					*4.1°x3.1°	5.6°x4.2°	
		X1.0		2.7°x2.1°					*2.7°x2.1°		2.7°x2.1°	3.7°x2.7°					*3.7°x2.7°	5.0x3.8°	
		X1.2		2.5°x1.9°					*2.5°x1.9°		2.5°x1.9°	3.3°x2.5°					*3.3°x2.5°	4.6°x3.4°	
Nf mount lens	VCL-03S12XM	f=3.5mm	*59.18°x44.18°						79.18°x59.18°								106.3°x79.18°		
	VCL-06S12XM	f=6mm	*33.18°x25.06°						44.06°x33.18°								57.48°x44.06°		
	VCL-7S12XEA	f=7mm Auto Iris							38.35°x28.15°								50.26°x38.35°		
	VCL-12S12XM	f=12mm	*16.48°x12.8°						22.24°x16.48°								29.48°x22.24°		
	VCL-12SXM	special close up	*17.28°x13.07°						22.59°x17.14°								30.36°x22.54°		
Microscopy adaptor	MVA-15 (+ MVAC-33-C or MVAC-33-O)			●	●	●	●	●			●								
Back focus adjustment for C mount lens	LO-77ERK	C mount extension rings kit		●	●	●	●	●			●	●	●	●	●	●		●	●
	LO-999ERK	S 12 extension rings kit	●						●	●							●		
Nf mount to C mount	LO-999CMT	C mount converter for S 12	●						●	●							●		
Optical dust cover	LO-75D	used when IR cut filter is removed		●	●	●	●					●	●	●	●	●			

* It is requested to use LO-999CMT in case of a C Mount Lens for Nf mount type.

			B/W		Colour		B/W	
			1/3-inch CCD				1/2-inch CCD	
			CCB-M37 CCB-M37CE	CCB-M35A CCB-M35ACE	CCB-GL5 CCB-GL5P	CCB-GC7YC CCB-GC7YCP	CCB-M27B CCB-M27BCE	CCB-M25 CCB-M25CE
Accessory	**Reference**	**Description**						
Lens	CCL-C06Z	f=6mm	45.6˚x33.6˚		45.6˚x33.6˚			
Optical filter kit	LO-GC7	700 h pixels				●		
Extension cables	CCE-50M	flat, 50mm	●	●	●	●	●	●
	CCE-50R	flat, 50mm	●	●	●	●	●	●
	CCE-150R	flat, 150mm	●	●	●	●	●	●
Power supply board	PSB-915IA		●	●			●	●

			Colour		
			1/3-inch CCD		1/2-inch CCD
			DFW-V500	DFW-VL500	DFW-V300
Accessory	**Reference**	**Description**			
C mount lens	VCL-08YM	f=8mm	32.6˚x24.8˚		42.6˚x32.6˚
	VCL-12YM	f=12mm	22.4˚x16.9˚		29.6˚x22.4˚
	VCL-16YM	f=16mm	17.0˚x12.8˚		22.6˚x17.0˚
	VCL-25YM	f=25mm	11.0˚x8.2˚		14.6˚x11.0˚
	VCL-50YM	f=50mm	5.5˚x4.1˚		7.3˚x5.5˚
C mount macro lens	VCL-M45YM	X0.5			5.36˚x4.02˚
		X1.0			4.05˚x3.04˚
	50 MM macro lens	X0.8			4.1˚x3.1˚
		X1.0			3.7˚x2.7˚
		X1.2			3.3˚x2.5˚
Microscopy adaptor	MVA-15 (+ MVAC-33-C or MVAC-33-O)		●		
Back focus adjustment for C mount lens	LO-77ERK	C mount extension rings kit	●		●
Conversion	VCL-0637W	0.6x wide conversion		●	

			Description Colour								
			1/4-inch CCD		1/3-inch CCD						
			FCB-IX47 FCB-IX47P FCB-IX470 FCB-IX470P	FCB-EX47L FCB-EX47LP FCB-EX470L FCB-EX470LP	EVI-370 EVI-371	EVI-370D EVI-371D	EVI-370G EVI-371G	EVI-370DG EVI-371DG	EVI-D30 EVI-D31	EVI-400 EVI-401	EVI-400DR EVI-401DR
Accessory	**Reference**										
Remote control board	FK-69				●	●	●	●			
Conversion lens	VCL-0637W	0.6x wide conversion	●	●	●	●	●	●	●	●	●
Filter attachment adaptor	LO-400F									●	●

The Sony range of HMDs has many applications.
Here are just a few...

Flight simulation
Ophthalmology
Virtual Reality
Augmented Reality
Medical
Museum display
3-D graphics
Architectural modelling
Arcade games
Computing
Mobile security
Control
Broadcast monitoring
Driving simulation
Telerobotics
Entertainment
Information tools
CAD/CAM
Sports simulation

HMD Technology

Personal LCD Displays	p.52 - 55
Personal LCD Display Blocks	p.56 - 57
Digital Signal Converter	p.58
Professional Headband	p.59

LDI-100B (NTSC) / LDI-100BE (PAL)

new LDI-50B (NTSC) / LDI-50BE (PAL)

Outline

The LDI-50BE and LDI-100BE are compact and lightweight personal LCD displays which can be easily integrated into portable systems. With their durable magnesium alloy construction, they are ideal tools for a wide range of applications where portability and resolution are requested such as telerobotics, medical, simulation, Virtual Reality, security and broadcast monitors.

The LDI-50BE features a pair of superior resolution (180 000 pixels) 0.7-inch TFT LCD screens, providing a virtual image size similar to a 52-inch display at a distance of 2 metres. The input signal is a standard composite signal. The LDI-100BE features a pair of high resolution (1.5 million pixels) 0.7-inch TFT LCD screens, providing a virtual image size similar to a 30-inch display at a distance of 1.2 metres. A wide range of video and computer input signals is accepted.

An adjustable shutter see-through mode (LCD shutter system on the LDI-100 Series, mechanical shutter system on the LDI-50 Series) enables the user to simultaneously watch the display and the surroundings "transparently". The power supply / battery charger box as well as the sunshades are supplied accessories.

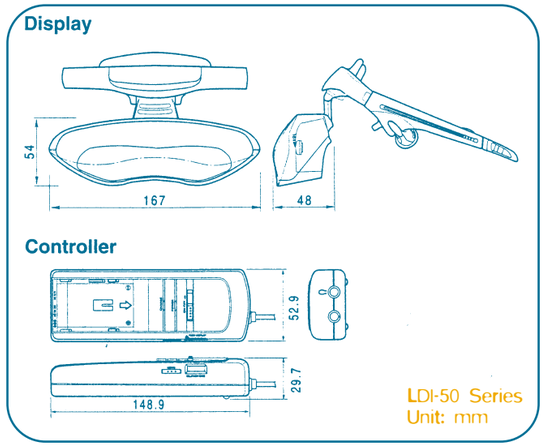
- **High-resolution 0.7-inch LCD with built-in backlight.**
- **Computer RGB input compatible on LDI-100BE.** (SVGA / VGA)
- **Control box featuring OSD menu for video picture settings, advanced RGB settings on LDI-100BE for tracking, H/V centring and sync adjustment.**
- **Energy saving mode for battery operation.**
- **Built-in folding Megabass earphones.**
- **See-through mode.**

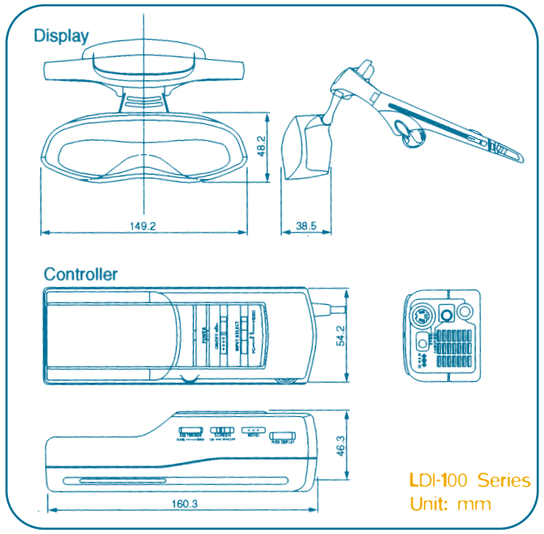
Specifications	LDI-50B	LDI-50BE	LDI-100B	LDI-100BE
Signal system	NTSC	PAL	NTSC	PAL
LCD panels	2x 0.7-inch poly-Si TFT, 180 K dots		2x 0.7-inch poly-Si TFT, 1.5 M dots	
Dot number / panel	800 (H) x 225 (V)		832 (H) x 624 (V) x 3	
Virtual image size	52-inch at 2m		30-inch at 1.2m	
Angle of view (H)	30°		28°	
Video input	Composite		Composite, Y/C	
RGB** input	N/A		VGA, SVGA, Macintosh	
Power requirements	DC 7.5 V~ 9 V; 3.8 W		DC 7.5 V~ 10 V; 10 W approx. at PC mode	

Input signal for LDI-100B/E

	Display mode	Screen resolution (dot x line)	Horizontal (kHz) Refresh	Vertical (Hz) Refresh
Apple Macintosh series	13" colour modes	640 x 480	35.0	67
	16" colour modes	832 x 624	49.7	75
NEC PC-9801/9821 series	-	640 x 400	24.8	56
DOS / V (IBM PC / AT)	VGA graphics	640 x 480	31.5	60
	VGA text	640 x 400	31.5	70
	VESA VGA	640 x 480	37.9	72
	VESA VGA	640 x 480	37.5	75
	VESA VGA	640 x 480	43.3	85
	VESA SVGA	800 x 600	35.2	56
	VESA SVGA	800 x 600	37.9	60
	VESA SVGA	800 x 600	48.1	72
	VESA SVGA	800 x 600	46.9	75
	VESA SVGA	800 x 600	53.7	85
	XGA**	800 x 600	31.5	60

* Separate HD, VD only, not sync on green or composite sync
** No true XGA





Supplied Accessories

Sunshade for LDI-50 Series

Sunshade for LDI-100 Series

Mini-jack cable

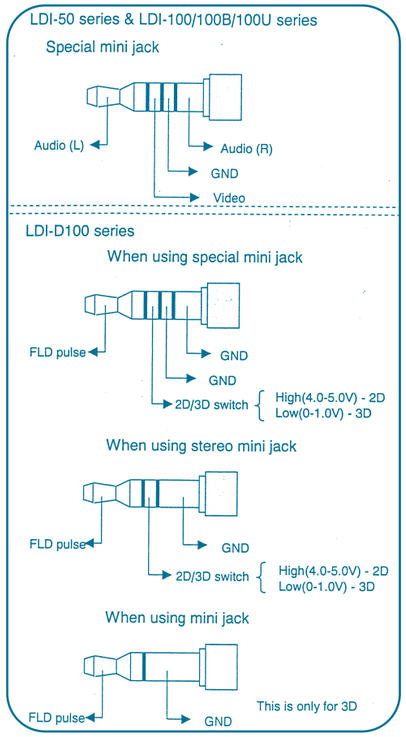
This 3-metre mini-jack to 3x phono connector cable has various functions depending on the LDI model.

With the LDI-50BE, LDI-D50BE and LDI-100BE, it allows the user to input a composite signal (3-D field sequential composite signal in case of LDI-D50BE) and Left/Right audio signals.

The LDI-D100BE, it allows the user to input an external sync signal via the white phono connector, while the yellow connector is used to switch between 3-D to 2-D modes. Please refer to the following chart for more details.

AC power adaptor for LDI-50 Series

AC power adaptor for LDI-100 Series



LDI-D100B (NTSC) / LDI-D100BE (PAL)

new LDI-D50B (NTSC) / LDI-D50BE (PAL)

Outline

The LDI-D50BE and LDI-D100BE are the stereoscopic versions of the LDI-50BE and LDI-100BE. The stereoscopic capability of their personal LCD displays makes them ideal for a wide range of 3-D immersive applications such as medical simulation, telerobotics, flight simulation or Virtual Reality.

The LDI-D50BE accepts a field interlaced composite signal. The LDI-D100BE accepts a field interlaced Y/C signal, and is also compatible with a wide range of frame sequential computer input signals, from VGA up to true SVGA 85 Hz. This model also features an internal and external synchronisation capability, providing external control of the Left/Right picture inversion via a dedicated TTL signal input.

The power supply / battery charger box is provided as a standard accessory, as are a pair of sunshades and a mini-jack cable (used for video input with the LDI-D50BE and for external synchronization with the LDI-D100BE).

- **Frame sequential RGB input capability** (LDI-D100BE)
- **Field sequential Video input capability**
  (Composite on LDI-D50BE, Y/C on LDI-D100BE)
- **Automatic synchronisation capability in Field Sequential Video mode** (Composite, Y/C).
- **External synchronisation capability in Frame Sequential RGB mode** (LDI-D100BE).
- **See-through mode.**

Specifications	LDI-D50B	LDI-D50BE	LDI-D100B	LDI-D100BE
Signal system	NTSC	PAL	NTSC	PAL
LCD panels	2x 0.7-inch poly-Si TFT		2x 0.7-inch poly-Si TFT	
Dot number / panel	800 (H) x 225 (V)		832 (H) x 624 (V)	
Virtual image size	52-inch at 2m		30-inch at 1.2m	
Angle of view (H)	30°		28°	
Video input	Composite field sequential		Y/C field sequential	
RGB** input	N/A		Frame sequential VGA, SVGA	
Synchronisation pulse for RGB frame sequential input	N/A		External mode: Mini jack - phono connector TTL signal, 50% duty Internal mode: automatic synchronisation*	
Polarity switch	N/A		Left-Right manual inverter	
Audio separated input	Mini jack		Mini jack	
Power requirements	DC 7.5 V~ 9 V; 3.8 W		DC 7.5 V~ 10 V; 10 W in PC mode	

*Operating in this mode is the responsibility of the user. Sony does not accept any responsibility for the consequences of using the Left/Right picture inversion mode. **Separate HD, VD only, not sync on green or composite sync

Input signal for LDI-100B/E

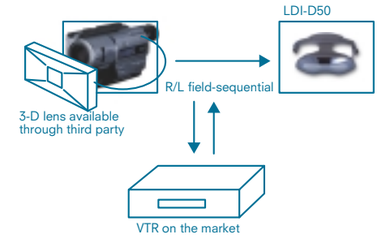
	Display mode	Screen resolution (dot x line)	Horizontal (kHz) Refresh	Vertical (Hz) Refresh	Stero Mode: pictures / eye / sec
Apple Macintosh series	13" colour modes	640 x 480	35.0	67	33.5
	16" colour modes	832 x 624	49.7	75	37.5
NEC PC-9801/9821 series	-	640 x 400	24.8	56	28
DOS / V (IBM PC / AT)	VGA graphics	640 x 480	31.5	60	30
	VGA text	640 x 400	31.5	70	35
	VESA VGA	640 x 480	37.9	72	36
	VESA VGA	640 x 480	37.5	75	37.5
	VESA VGA	640 x 480	43.3	85	42.5
	VESA SVGA	800 x 600	35.2	56	28
	VESA SVGA	800 x 600	37.9	60	30
	VESA SVGA	800 x 600	48.1	72	36
	VESA SVGA	800 x 600	46.9	75	37.5
	VESA SVGA	800 x 600	53.7	85	42.5
	XGA*	800 x 600	31.5	60	30

* Not true XGA, displayed in SVGA 800x600

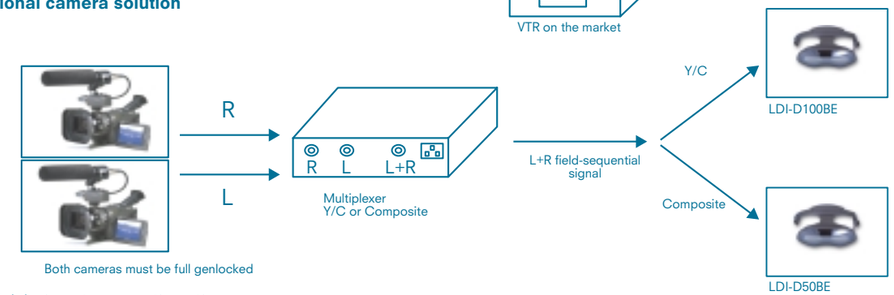
How to generate a 3-D signal?

1 Video signal connection diagrams

Cost-effective solution



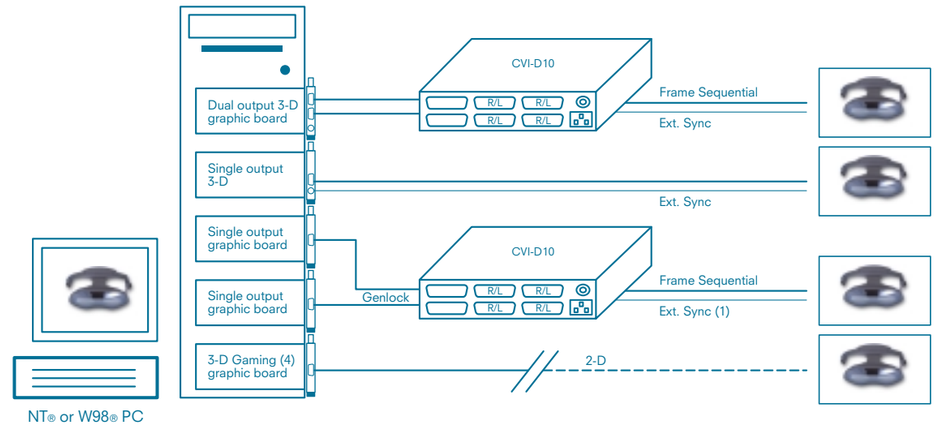
Professional camera solution



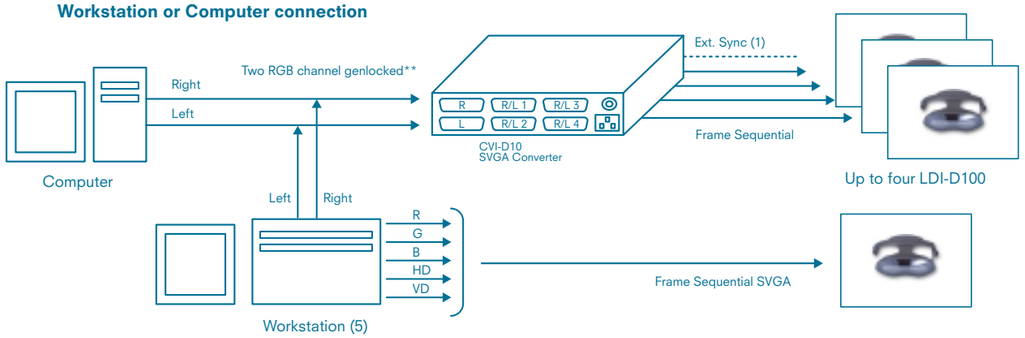
Both cameras must be full genlocked

2 RGB (3) signal connection diagrams

Cost-effective computer solution



Workstation or Computer connection



(1) External synchronisation pulse is not mandatory. Automatic synchronisation mode operation is the responsibility of the user.
(2) Two-channel operation requires full signal genlocking (phase and timing).
(3) Separated HD, VD only, not sync on green nor composite sync.
(4) Some 3-D gaming boards. Please contact your local Sony sales office for details. Separated genlocked video boards on two different computers is a possible solution.
(5) Latest available drivers for workstations. Please contact your local Sony sales office for details.

LDI-100U (NTSC) / LDI-100UE (PAL)
LDI-50U (NTSC) / LDI-50UE (PAL)
LDI-D100U (NTSC) / LDI-D100UE (PAL)
LDI-D50U (NTSC) / LDI-D50UE (PAL)

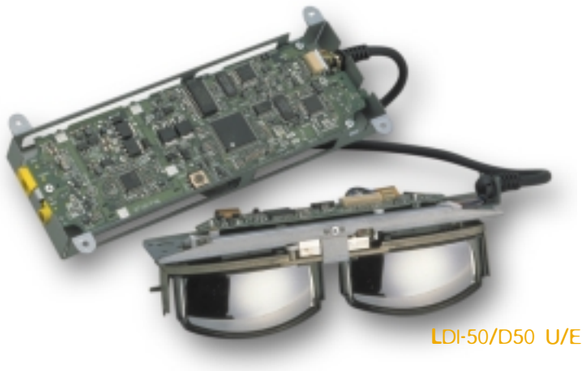
new

Outline

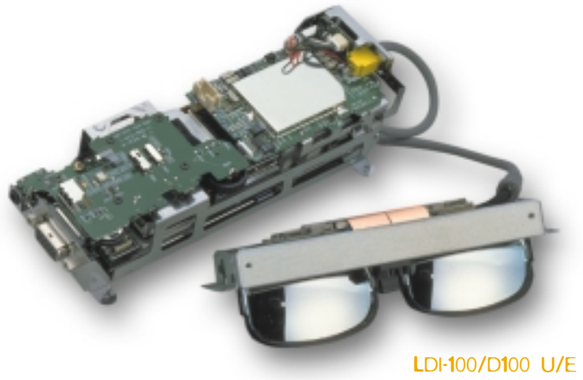
The LDI-100UE and LDI-50UE are the unfinished version of the LDI-50BE and LDI-100BE Series, while the LDI-D100UE and LDI-D50UE are the unfinished versions of the LDI-D50BE and LDI-D100BE models.

These display blocks are especially designed for OEM and system integrators who are looking for an affordable and high-quality portable LCD monitor. Small size and even lighter weight make them easy to integrate into portable inspection systems, firemen's helmets, medical diagnostic systems or even wearable computers. These displays can also fit most existing VR helmet housings, where their superior SVGA resolution provides excellent dynamic immersion for the user.

The LDI-U Series comes without a shutter function, housing, energy saving mode, battery, audio earphones and accessories, while the image settings remain accessible through the miniaturised control box switches. However a miniaturised audio connector is available on top of the glasses for external audio. The signal inputs requirements are exactly the same as for other models.

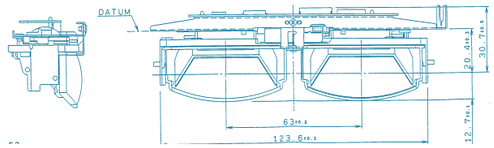


LDI-50/D50 U/E



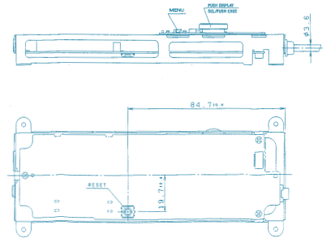
LDI-100/D100 U/E

Display



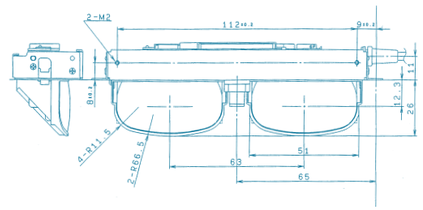
LDI-50UE + LDI-D50UE

Controller



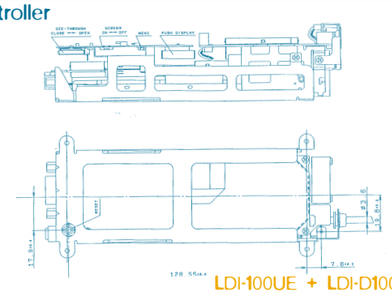
LDI-50UE + LDI-D50UE

Display



LDI-100UE + LDI-D100UE

Controller



LDI-100UE + LDI-D100UE

Specifications	LDI-50UE	LDI-D50UE	LDI-100UE	LDI-D100UE
Signal system	NTSC / PAL		NTSC / PAL and RVB	
LCD panels	2x 0.7-inch poly-Si TFT		2x 0.7-inch poly-Si TFT	
Dot number/panel	800 (H) x 225 (V)		3x 832 (H) x 624 (V)	
Virtual image size	52-inch at 2 m		30-inch at 1.2 m	
Angle of view (H)	30°		28°	
Video input	Composite	Composite field sequential	Composite, Y/C	Y/C field sequential
RGB input *	N/A		VGA, SVGA	Frame sequential VGA, SVGA
Synchronisation pulse for RGB frame for sequential input	N/A		N/A	Internal mode: automatic syn** External mode: Mini-jack phono connecter
Syn inverter switch	N/A		N/A	Left-Right manual inverter
Operating temperature	5 °C to 35 °C			
Audio separated input	Mini-jack on control box plus connector on top of the glasses			
Weight: - Control box	100 g		240 g	
- Display unit	130 g		105 g	
Standard cable length	1.2 m			
Power consumption	3.8 W		10 W in PC mode, 12 W in video mode	
Power requirements	DC 7.5 V ~ 9 V		DC 7.5 V ~ 10 V	

* Separate HD, VD only, not sync on green or composite sync * Operating in this mode is the responsibility of the user. Sony does not accept any responsibility for the consequences of using the Left/Right picture inversion mode.

new CVI-D10

Outline

The CVI-D10 is a digital signal converter for dual output workstations and computers. It has three functions. Firstly, it multiplexes two SVGA signals to a one frame sequential SVGA signal. Secondly, it generates four external synchronisation signals for LDI-D100BE operation. Finally, it distributes four SVGA signals as well as the four external synchronisation signals.

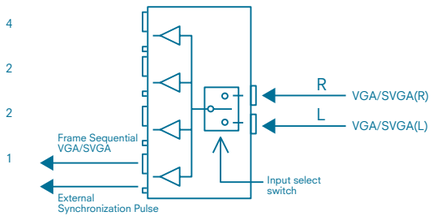
The unit includes an input selector switch to select the Frame Sequential, Single Right or Single Left signal for distribution.

It represents the ideal connection solution for dual output workstations as well as PC platforms, bringing high graphic quality to demanding stereoscopic applications. With its four output channels, it is also perfectly suited for marketing applications, exhibitions, and multi-user applications.

A wide range of RGB computer input signals are compatible. The input signal is a standard RGB* signal, up to 85 Hz per channel. LDI-D100BE drivers for most common workstations are also available (please contact your local Sony sales office for details).

- **Workstation designed SVGA / VGA input up to 85 Hz per channel capability**
- **Frequency reducer, two 85 Hz inputs gives one 85 Hz frame sequential output**
- **Dimensions:** 300 (W) x 200 (H) x 100 (D) mm folded, 1.2 kg

Specification	CVI-D10
RGB output signals	Left only, Right only, Multiplexed
Output connectors	4 x RGB connectors, 4 x external sync phono connectors
Output selector	Left, Right, or Frame Sequential multiplexed
Input connectors	2 x RGB
RGB input signals	VGA, SVGA



Input signal for CVI-D10

	Display mode	Screen resolution (dot x line)	Horizontal Refresh (kHz) per channel	Vertical Refresh (kHz) per channel	Multiplexed output vertical (Hz) refresh
Apple Macintosh series	13" colour modes	640 x 480	35.0	67	67
	16" colour modes	832 x 624	49.7	75	75
NEC PC-9801/9821 series	-	640 x 480	24.8	56	56
DOS / V (IBM PC / AT)	VGA graphics	640 x 480	31.5	60	60
	VGA text	640 x 400	31.5	70	70
	VESA VGA	640 x 480	37.9	72	72
	VESA VGA	640 x 480	37.5	75	75
	VESA VGA	640 x 480	43.3	85	85
	VESA SVGA	800 x 600	35.2	56	56
	VESA SVGA	800 x 600	37.9	60	60
	VESA SVGA	800 x 600	48.1	72	72
	VESA SVGA	800 x 600	46.9	75	75
	VESA SVGA	800 x 600	53.7	85	85
	XGA**	800 x 600	31.5	60	60

** No true XGA
* Separate HD, VD only, not sync on green or composite sync

new Professional Headband

Outline

The Glasstron Series includes a new headband specially designed for professionals and available as an optional accessory.

The combination of this new lightweight headband and a display unit weighing just 120 g represents one of the lightest, most portable, high resolution display system. The headband can be fitted* to all finished models with the conversion kit provided after removing the existing headband. The audio capability and the energy saving function (100 series only) are not supported with this lightweight headband fitted.

Featuring multi-settings, designed for supporting movement tracking systems and position tracking devices, this accessory represents the perfect match for virtual reality, medical, industrial inspection or any other professional and highly demanding application. In addition, the ergonomic design of both headband and display allow them to be worn comfortably with spectacles.

Note: This model does not yet comply with current CE regulations and therefore cannot be purchased in the EU unless one of the following criteria is met:

- The unit will be resold outside the European Union.
- The unit is integrated into a system which will comply with CE regulations.

*** This modification is the user responsibility. Please contact your local Sony office for details on mounting process.**

NP-F950
NF-P750
NF-P550

Outline

These lightweight batteries feature the latest Li-Ion technology and are particularly recommended for intensive use with the LDI finished Series. Featuring the InfoLithium function, the LDI control box includes a battery charger for all the NP-F battery Series listed below.

Approximate viewing time	LDI-50 series	LDI-100 series**
NP-F950	6 h	3 h
NP-F750	4 h 40	2 h
NP-F550	2 h 20	1 h

** When a video input is used, the approximate viewing times shown are reduced by around 80%

NP-F550 NP-F750 NP-F950

Glossary of Camera and HMD terminology.

0 LuxShot : Technique allowing pictures to be shot without visible light. The camera is switched to its infrared sensitivity mode and infrared lighting (built-in to Sony IR sensitive cameras) is used to illuminate the scene. As the picture is only infrared, no significant colour information is displayed. The picture looks slightly greenish, like an image intensifier picture. NOTE : In 0 LuxShot mode, the iris remains fully open position, and the high-speed shutter feature does not function.

3-D (three dimensions or three-dimensional) : Implies a stereoscopic image, but is also used to describe a two dimensional image that gives a perception of depth. When 3-D images are made interactive, so that the viewer feels involved with the scene, the experience is called virtual reality. Virtual reality experiences may also require additional equipment.

4:4:4 / 4:2:2 / 4:1:1 : Indicates the sampling applied to the Y/R-Y/B-Y components of an analogue video signal when it is converted into a digital signal. The three numbers indicate the ratio of the sampling rates applied to the individual signals. 4:4:4 indicates that the same sampling rate has been applied to all three signals, 4:2:2 means that the sampling rate of the R-Y and B-Y colour difference signals is half that of the luminance signal Y, while 4:1:1 indicates that their sampling rate is one quarter that of the Y signal.

AE (Auto Exposure) : Combined use of AGC and iris motor control allows shooting in a broad range of lighting conditions. AGC amplifies the video signal in low light conditions, iris reduces it in high light conditions. Motor iris control can be replaced by CCD Iris control.

AF (Autofocus) : Available in cameras equipped with motorized focus, this feature provides automatic adjustment of the focus. AF operates by varying the focus to maximize the high frequency content of the central area of the picture by reference to high luminance and strong contrast elements. In some cameras, AF can be set to High or Low sensitivity modes. AF mode is not recommended for continuous 24-hour operation. See also One-push AF, Interval AF, Zoom triggered AF.

AGC (Automatic Gain Control) : Circuitry that automatically adjusts the electronic amplification of the video signal to compensate for varying levels of scene illumination.

Aliasing : Interference phenomenon which occurs when a sampled signal contains frequencies that are higher than half the sampling frequency. A CCD samples the picture spatially. An optical low-pass filter is used to avoid aliasing, especially in colour applications.

Aperture correction : Camera signal processing function which adjusts the enhancement of edges of objects in a picture.

Aspect Ratio : The ratio of width over height of an image, 4:3 for a standard TV image, 16:9 for wide screen.

Asynchronous transmission mode : IEEE 1394 data transmission mode without a guaranteed data delivery time. Used in IEEE 1394 cameras for control functions and reports.

ATW (Auto Tracking White balance) : In ATW mode, white balance is continuously being adjusted according to the colour temperature of the scene illumination.

Backlight compensation : Special compensation option in AE (Auto Exposure) mode. When the background is too bright and/or when the subject is too dark, backlight compensation modifies the action of Auto Exposure to make the subject appear clearer.

CCD (Charge Coupled Device) : Semiconductor device made of a matrix (or lines) of individual photosensitive elements, called pixels. The optics focus the scene onto the matrix and each pixel accumulates an electric charge proportional to the local intensity of received light and to the integration time. At read out time, all charges are transferred at the same time to an output matrix protected from light, where a sequential reading may take place while a new picture starts integrating. The output matrix size is half that of the sensitive matrix size for interlaced mode CCDs, and the same size for progressive scan CCDs.

CCD Iris : Special operating mode of the electronic shutter of a CCD camera. The shutter timing is automatically adjusted to maintain the same video output level, irrespective of the scene illumination. Can only reduce the camera sensitivity. Allows the use of a fixed iris lens under variable lighting conditions. Often combined with AGC.

CCIR : B/W video standard with 625 lines / frame, 2 interlaced fields / frame, 25 frames / second. Monochrome version of PAL.

CCU (Camera Control Unit) : The CCU provides a means of controlling a remote camera. So that the remote camera can be as small and light as possible, the CCU also includes all electronic circuits that do not have to be fitted inside the remote head, these are typically signal processing circuitry, input/output interfaces and power supply.

Chrominance : Colour part of the composite video signal. Also called C. Separately transmitted in Y/C (S-video). It is the combination of the two colour difference signals (U or R-Y) and (V or B-Y) modulated on to a subcarrier. See also YUV.

CHU (Camera Head Unit) : In a remote head camera system, the CHU is a small unit that only includes the sensor, its optical interface, the cable coupling to a CCU and the minimum amount of electronic circuitry.

Composite sync : Combination of the HD and VD in one signal. Commonly used as a synchronizing or genlock signal in B/W systems.

Depth of field : Distance between the nearest and farthest points in a scene that are in focus as viewed by a particular lens. Affected by choice of lens focal length and iris aperture. Increases with both decreasing lens focal length and decreasing iris aperture.

Donpisha : Means “immediate” in Japanese. CCD sensor shuttering technology for asynchronous shooting of fast moving objects without a time delay.

DSP (Digital Signal Processing) : Inside a camera, sensor signals must be processed in several steps before they can be displayed / transmitted. Typical processing steps are amplification, gamma correction, black level correction, highlight compression/clipping, edge enhancement, colour processing, colour balance, colour correction, output signal encoding. Picture quality is highly dependent on the accuracy and the stability of these processes. In DSP technology, the sensor signal is converted to digital form after initial amplification, and all processing is achieved digitally, ensuring high quality and no drift. Output signals remain in digital form or are converted back to analogue depending on the camera output mode.

E-Donpisha : Enhanced asynchronous shutter. Available with external and internal synchronization modes. The camera CCD starts to accumulate electrons on receipt of an external trigger pulse. Shutter speed is selected by a switch or menu setting.

E-Donpisha - II : Asynchronous shutter mode. Available in external sync mode only. Timing of accumulation and shutter speed are controlled by the external trigger signal. Shutter speed is controlled by the width of the pulse and VD controls the timing for image output.

EIA (Electronics Industries Association) : B/W video standard with 525 lines / frame, 2 interlaced fields / frame, 30 frames / second. Monochrome version of NTSC video signal. Also referred to as RS-170.

Electronic shutter : CCD camera operating mode where the integration time can be shortened without any mechanical device. Used for blur reduction when capturing fast moving objects, and for camera sensitivity reduction in high levels of scene illumination.

External polarity sync signal : Used to synchronize RGB format in frame sequential 3-D mode for mono input. This signal is generated by workstations or 3-D graphic adopters allowing the images in a head mounted display to be switched from Left to Right picture accordingly to its timing.

Field sequential†: Special use of the Composite or Y/C format in order to transmit left and right picture in one signal in 3-D encoding. Also called multiplexed video format. Odd and even fields are not related to the same pictures, even fields represent the right picture, while odd fields represent the left picture.

Frame sequential†: Special use of the RGB format used for 3-D computer graphic animation, also called multiplexed SVGA format. The pictures follow a serial rule, alternating left and right pictures sequentially.

F Stop, F Number : Calibrated measure of lens iris aperture. Common F stops are F1.4, F2, F2.8, F4, F5.6, F8, F11, F16, F22. The higher the number, the smaller the iris aperture and the less light falling on the imager.

Field : Half of a TV picture consisting of only the odd or only the even lines. NTSC/EIA features 60 fields of 262.5 lines / second. PAL/CCIR features 50 fields of 312.5 lines / second. Odd / even field pairs recombine on screen as frames due to picture tube and human eye memory.

Field / frame integration : Two different pixel readout techniques in CCDs designed for interlaced output. Refers to the total integration time, field duration (16.6 ms NTSC/EIA or 20 ms PAL/CCIR) or frame duration (33.3 ms NTSC/EIA or 40 ms PAL/CCIR). Both modes give the same sensitivity. In field integration, pixels of two adjacent lines are read out together as one. The full CCD is read every field, achieving higher picture refresh rate but lower vertical resolution. Mostly used in current applications to achieve optimum capture of movement. Adjacent lines are combined differently for odd (1+2, 3+4, . . .) and even field (2+3, 4+5, . . .) outputs. In frame integration, pixels are read out separately. The complete CCD is read after two fields. Full vertical resolution is achieved. Progressive scan CCDs operate only in frame integration.

FIT (Frame Interline Transfer) : In FIT CCD technology, the electric charge on exposed pixels is transferred to a light-shielded readout zone that is totally separated from the light sensitive area. Dramatically reduces vertical smear compared to IT type CCDs. Mostly reserved for broadcast camera applications.

Focal length : Distance between the optical centre of a lens and the image focal point. Fixes the magnification and the angle of view of a lens. Vari-focal and zoom lenses have a variable focal length.

Frame : One complete TV picture consisting of two sequential interlaced scanned fields. NTSC/EIA has 30 frames of 525 lines per second. PAL/CCIR has 25 frames of 625 lines per second.

Gain : The electronic amplification factor of a signal.

Gamma : Correction law introduced in the camera output signal to compensate for the non-linearity of the CRT (Cathode Ray Tube) in video monitors. A typical gamma value is 0.45, which results in the brightness component of the CRT picture appearing to be linear.

Genlock : Circuitry that synchronizes one video signal to another video signal. There are three types of genlock : V-lock, HV-lock and full colour. V-lock is useful when simply switching from one B/W colour source to another

HV-lock is used for full synchronization of B/W cameras, and requires a HD + VD input, composite sync input or composite VS video signal input. In the case of colour cameras, this type of synchronization can be used when cutting between pictures, but not for mixing between them. Full colour genlock is used when pictures have to be mixed without colour degradation. It needs VBS composite video input.

HAD (Hole Accumulated Diode) : CCD technology with improved performance in spectral response, vertical smear and sensitivity. The HAD sensor also introduced a higher pixel count and electronic shuttering capability.

HD (Horizontal Drive) : Signal used to synchronize the line scan rate of the camera to an external source. Mostly used in B/W applications together with VD.

High rate scanning : Capability of a camera to output less than its maximum number of horizontal lines, but at a higher rate. Unlike partial scanning, the lines output in high rate scanning are symmetrical about the optical sensor centre. This means that there is normally no need to re-aim the camera when changing from normal to high rate scanning.

HMD (Head Mounted Display) : A personal LCD display. On this type of display, the screen is always in front of the user eyes, even when the viewerís head is turned. Usually consists of a display unit and a power supply box.

Horizontal Resolution : Number of equally spaced vertical black-to-white or white-to-black transitions that the camera is able to reproduce, divided by the aspect ratio (usually 4/3) to make a comparison between horizontal and vertical resolution easier. Usually expressed as TV lines per picture height. Indicates the amount of horizontal details that can be perceived. Horizontal resolution is limited by the number of pixels in one line and by the type of colour filter used, if any.

Hyper HAD : A derivative of the HAD sensor that incorporates microscopic lenses mounted over each sensing pixel. Hyper HAD sensors have no perceptible smear and are nearly twice as sensitive as HAD sensors.

IEEE 1394 : A digital networked serial interface for high-speed data transmission. Available speeds are 200 and 400 Mb/s, and 800 Mb/s speed is planned in the near future. IEEE 1394 is an ideal interface between a computer and audio/video products because of its ability to transfer a real-time data stream at low cost, with high reliability and ease of use.

Interlaced scanning : Scanning method in which half of the lines are scanned in one field (odd-numbered lines), and the other half are scanned in the next field (even-numbered lines). Thus adjacent lines of a complete picture (one frame) belong to successive fields. Interlaced scanning doubles the screen refresh rate as seen by the viewer and reduces flicker. At screen refresh rates significantly higher than the 25/30 frames/second used in TV systems, interlaced scanning may not be necessary.

Interval AF : AF (Auto Focus) mode is periodically switched ON, then OFF (fixed focus). The duration of the on and off intervals is separately adjustable.

IT (Interline Transfer) : In IT CCD technology, the charges on exposed pixels are transferred to light-shielded vertical readout zones embedded in the sensitive area. IT devices are simpler to manufacture and are therefore less costly than FT or FIT devices. Mostly used in industrial and consumer cameras.

Iris : An adjustable sized aperture in a camera lense that controls the amount of light reaching the imager. Compensates for changing lighting conditions. Iris control may be either manual or automatic, depending on the application and the type of camera. When iris is fixed, a variable electronic shutter can be used instead (CCD Iris).

Isochronous transmission mode : IEEE 1394 data transmission mode featuring guaranteed transmission timing and bandwidth. Appropriate for just-in-time transmission of video and audio and computer data.

Long-term integration : Special camera mode similar to the ‘B’ setting of a photographic camera shutter. The CCD integrates over a long (user-defined) period, providing very high sensitivity. Object must be stationary, external camera control and a frame memory are needed.

Luminance : The part of a composite video signal that expresses brightness. Also called Y. Separately transmitted in Y/C (S-video).

Lux (lx) : The SI measurement of light intensity taken at the surface which the light source is illuminating. The measure of the total lumens falling upon a unit of area. 1 lumen per square metre. One Foot-candle equals 10.76 lx.

Minimum illumination : Minimum light level needed to achieve a 50% or 100% video output level when the camera is at maximum gain and the lens iris fully open. Can be computed from the nominal sensitivity, lens characteristics and maximum gain.

MOD (Minimum Object Distance) : A lens parameter that defines the minimum distance from a camera lens to the point where an object can still be in focus.

MD (Motion Detector) : Camera feature where a reference field is compared with current fields. If a difference is detected, the camera outputs a pulse. An ideal feature for security application.

MTF (Modulation Transfer Function) : Defines the resolution capability of a lens. Most lenses exhibit their best MTF when operated in the middle of their iris aperture range.

Multiplexing :†In an HMD, the combination of two identical format signals, either video or RGB, that follow a combination rule. The combination of two video signal gives a field sequential signal, while the combination of two RGB signals gives a frame sequential signal.

ND Filter (Neutral Density Filter) : A grey filter added in front of a lens to reduce the amount of incoming light into the camera lens. It has no influence on colour.

NTSC (National Television System Committee) : Colour video standard, used mainly in the United States and Japan. NTSC uses 525 scanning lines per picture, 30 pictures (frames) per second, each frame is made up of two sequential fields containing respectively the even and the odd lines (interlace).

One-push AF (One-push Auto Focus) : Focus hold mode, that can be automatically readjusted as required by the user (One-push AF Trigger), assuming that the required subject is within the focusing limits of the camera lens.

One-push WB (One-push White Balance) : Fixed white balance mode that can be automatically readjusted as required by the user (One-push WB Trigger), assuming that a white object, in suitable lighting conditions and occupying more than half of the image area, is seen by the camera.

OSD (On Screen Display) : Electronic superposition of text in the output picture. Typically used to display time/date information, camera identification, camera mode, etc or a function control menu.

PAL (Phase Alternation, Line) : Colour video standard pioneered in Europe but also used in many other parts of the world. PAL uses 625 scanning lines per picture, 25 pictures (frames) per second, each frame is made up of two sequential fields containing respectively the odd and the even lines (interlace).

Pixel : Picture element.

PowerHAD : PowerHAD is further improvement of the Hyper HAD CCD technology, where the microscopic lenses focus more light onto the light sensors. Increased sensitivity and reduces smear.

Progressive Scan : CCD design that allows the acquisition of both odd and even fields at the same time. Progressive scan makes full vertical resolution possible in Donpisha mode.

RGB (Red, Green, Blue) : The primary colours of light that produce a colour video image. In video, RGB refers to a system in which these three primary colours are kept isolated and delivered from the source to the display device over separate wires. This system results in high-quality pictures. RGB signals are used in some broadcast video equipment and computers.

Restart / Reset : Special mode in which the CCD readout cycle is stopped and restarted in synchronization with an external event. In the Stop mode, the CCD still accumulates picture information.

RS-232C : Serial data transmission standard for computers which can also be used to control camera functions.

Scaleable scanning : Capability of a camera to output a picture corresponding to an user defined sub-zone of the sensor. Applied in most recent IEEE 1394 digital cameras featuring the Format_7 output option (XCD-X700, XCD-SX900).

Screen Mode : Partial see-through mode on HMD allowing the user to view the surrounding environment by in the area only around the picture.

S-Donpisha : Asynchronous shutter mode used with external HD/VD sync. CCD starts to accumulate electrons when the external trigger pulse is received and stops when the VD pulse is received. Therefore the accumulation time (shutter speed) is decided by the length of time between the trigger pulse and VD input.

See-through Mode : A mode that allows an HMD user to view the surrounding environment by adjusting the transparency of the entire screen. The See-through Mode can be progressive, in the case of LCD shutters, or switched on and off with a mechanical mask.

Sensitivity : Lens iris aperture required to provide a video output signal of standard level at a specified light input. In general, sensitivity is measured using an 89.9% reflectance grey scale chart illuminated by a 3200 (K illuminant at 2000 lx (colour camera) or 400 lx (B/W camera), for a video output level of 100%.

S/N (Signal to Noise Ratio) : The ratio, usually expressed in dB (decibels), between the normal signal output and the noise level within an electronic signal.

Smear : Undesirable artefact of CCDs that appears in the picture as a vertical streak above and below a very bright object in the scene. Smear is caused by parasitic light getting into the vertical transfer registers. It is greatly reduced by the microlens-type of CCD used in Hyper HAD and Power HAD sensors. Almost suppressed in FIT CCDs.

Slow shutter : Shutter mode with an integration time longer than 1/50 s (PAL) or 1/60 s (NTSC). Like long-term integration, the slow shutter function increases camera sensitivity when shooting slow-moving or fixed subjects. Unlike long-term integration, continuous normal video is output in slow shutter mode by use of a built-in video memory. The output picture is compatible with normal monitors and recorders.

Square pixel : Used to qualify a CCD sensor where the centres of the pixels are equally spaced horizontally and vertically. Pictures captured from this type of non-square pixel sensor need to be software corrected in order to achieve the correct picture geometry.

Stereoscopy : Describes the methods used in the acquisition, transmission and reception of pictures and images with a three-dimensional appearance.

Sync (Synchronization) : When synchronized, the horizontal and vertical timing of a camera output are locked to an external signal coming, for example, from another camera. Pictures outputs from both sources are then precisely synchronized and can be mixed. When mixing colour signals the subcarriers of the two signals also have to be in synchronizm.

Subcarrier : The 4.43 MHz (PAL) or 3.59 MHz (NTSC) signal that is used as a carrier for the colour information. This subcarrier is modulated in amplitude by the colour saturation and in phase by the colour hue. A sample of the unmodulated subcarrier is placed before the start of each horizontal line, and is called the Colour Burst.

TFT : Thin Film Transistor LCD panel technology, featuring high refresh rate and no visual interference between adjacent displayed dots.

U and V : The names given to the two video colour difference signals (R-Y and B-Y) in their coded form in the PAL or NTSC colour systems. See also Y/R-Y/B-Y.

VBS (Video + Burst + Sync) : The composite video signal, including colour information.

VD (Vertical Drive) : Signal used to synchronize the field rate of a camera to an external source. Mostly used in B/W together with HD (Horizontal Drive).

Vertical Resolution : Number of equally spaced horizontal black-to-white or white-to-black transitions that a camera is able to reproduce. Indicates the amount of vertical details that can be perceived. Vertical resolution is limited by the number of scanning lines that are fixed by the TV standard.

Viewing angle: Angle calculated from the eye to the display screen border. Usually expressed horizontally for a head mounted display, it can also be vertical, or diagonal. The wider the viewing angle, the greater the sense of immersion.

Virtual Image : A reproduction of an object produced by light rays. An image-forming optical system gathers a beam of light diverging from an object point and transforms it into a beam that converges toward or diverges from another point, thus producing an image. If the beam converges to a point, a real image is produced; if the beam diverges, a virtual image is produced at its apparent source.

Virtual Reality : The full real-time simulation of a real or imagined environment that can be experienced visually in two or three of the three dimensions of width, height, and depth and that may additionally provide an interactive experience visually in full real-time motion with sound and possibly with tactile and other forms of feedback. The simplest form of virtual reality is a 3-D image that can be explored interactively at a personal computer, usually by manipulating keys or the mouse such that the content of the image moves in some direction or zooms in or out. Virtual reality can be divided into:
The simulation of real environments, such as the interior of a building. Typically used for training or education purposes
The development of an imagined environment, typically for a game or educational adventure

Virtual Reality system : A computer-based system that interacts with the user to create a three-dimensional, artificially simulated world that appears "real.'' Through the use of head-mounted displays, wraparound screens, audio synthesizers and computerized gloves with sensors, the user can manipulate his/her surroundings using voice commands, head movements, finger pointing and other natural gestures; it also is called cyberspace. Includes tracking devices, position and/or movement.

VISCA((Video System Control Architecture) : RS-232C serial control protocol intended to interface up to seven items of video equipment on one computer link.

V-Lock Sync: see Genlock.

VS (Video + Sync) : The composite monochrome video signal commonly used as the genlock signal in B/W systems.

WB (White Balance) : In a colour camera, white balance is the process of adjusting the values of its colour differences signals so that a white object in a scene illuminated by a particular source of illumination is displayed as a white or grey (i.e. no chrominance). The normal colour reference illuminant has a colour temperature of 3200 K, equivalent to a halogen lamp.
The human eye is a subjective device, constantly readjusting its colour balance according to the lighting context (our eye knows what must be seen as white). Unlike the human eye, a camera is an absolute measurement device, and its colour balance has to be adjusted to suit the colour temperature of the light illuminating the scene, for example sunlight is different from 3200 K. Several adjustment modes are available, fixed values (pre-adjusted), One-push, automatic tracking.
See also One-push WB and ATW.

Y/C (also called S-Video) : Separate signals for the Luminance and Chrominance parts of the video signal. Allows higher picture resolution and suppresses cross colour effects. Connector is the 4-pin mini-DIN.

Y/R-Y/B-Y : Three signals, luminance (Y) and two colour difference signals R-Y (red minus luminance) and B-Y (blue minus luminance) which together carry the brightness and colour information of colour images . Colour difference signals have no light intensity information, and cannot be displayed separately from Y. Compared to RGB signals, they can travel over longer cables lengths without significant resolution loss, and allows different spatial resolutions for luminance and colour. Typically used for high-end visual applications. Also known as component signals.
See also U and V signals.

Zoom Triggered AF : The camera is normally in fixed focus mode, but AF (Auto Focus) is switched temporarily switched on each time the zoom ratio of the camera lens is changed.

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